USE AND MISUSE OF GRAVITY EQUATIONS IN EUROPEAN INTEGRATION RESEARCH

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CONTENTS

1. Introduction[1])

Tinbergen (1962) had the brilliant idea to explain bilateral trade flows in analogy to Isaac Newton's famous law of gravitation by the attraction of two countries' „masses" (measured either by GDP or population), weakened by the „distance" (transport costs) between them and enforced by preferential arrangements they belong to. Since then the gravity equation became a popular instrument in foreign trade analysis. Until recently there were two lines of research in the gravity setting. On the one hand, many attempts were made to better underpin theoretically this empirical relationship (e. g., *Linnemann,* 1966, *Bergstrand,* 1985, 1989, *Helpman - Krugman,* 1985, *Helpman,* 1987, *Evenett - Keller,* 1997), on the other hand, the improvement of the econometric specification of the gravity equation was emphasized (e. g. most recently, *Mátyás,* 1997). The opening-up of Eastern Europe in 1989 has initiated a new field of application for the gravity approach. It was used to estimate the potential for East-West trade in case of an enlargement of the European Union towards the Central and Eastern European Countries (CEEC) as it can be employed for example to estimate Vinerian trade creation or trade diversion effects. Pioneers in this field were *Wang - Winters* (1991), *Hamilton - Winters* (1992) and *Baldwin* (1994). Most of these studies based their estimates on aggregate trade flows, some of them tried it with a disaggregated model proposed by *Bergstrand* (1989) (e. g., *Schumacher* ,1997, *Fidrmuc,* 1997). However, nobody questioned the applicability of a gravity equation with well specified and statistically significant estimated coefficients for the purpose of projecting bilateral trade flows for countries within the sample and hence also for countries outside the sample of a gravity equation.

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[1]) We are greatful to Karl Aiginger, Michael Pfaffermayr, Thomas Url, and Michael Wüger, all at the Austrian Institute of Economic Research (WIFO), for helpful comments. Irene Langer produced the valuable data set from the WIFO database.

Whereas the early studies estimated rather high trade potentials in Eastern Europe (*Wang - Winters*, 1991, *Hamilton - Winters*, 1992, *Baldwin*, 1994), most recent analyses stressed the supposition that the major part of the expected increases in trade flows could already have been realized (*Gros - Gonciarz*, 1996). The very rapid tying in the EU via trade liberalization agreements (Europe Agreements) led to a quick reorientation of CEEC trade from the former CMEA partners (primarily the former Soviet Union) towards the EU and hence improved East-West trade considerably.

The aim of our work is twofold. First, we look for that gravity equation of a common type with the best fit, which turns out to be that one *Baldwin* (1994) used. Second, we test two gravity equations that provide excellent estimation results and that are widely in use to estimate trade potentials in Eastern Europe for ex-post evaluation of the bilateral trade flows for the OECD countries (our estimation country sample just contains OECD countries). Then we look at the East-West trade potential. Hypothetical bilateral export flows are calculated by applying the coefficients from the estimation with the dependent variables of the countries out of the estimation sample, in our case the CEEC. It turns out that in such a framework one can hardly decide whether the recently estimated trade potentials (in particular those between East and West) are reliable predictions in the light of the huge forecast standard errors we found in our analysis.

2. Which Gravity Model Suits Best?

2.1 The Basic Equation and its Interpretations

The history of serious gravity equation research starts with *Linnemann* (1966). His basic equation (*Linnemann,* 1966, p. 34) explains the size of export flows (X_{ij}) from country i (the exporter) to country j (the importer) by the interaction of three factor groups:

(i) factors indicating total potential supply of the exporting country (E_i);

(ii) factors indicating total potential demand of the importing country (M_j);

(iii) factors representing the resistance (R_{ij}) to a trade flow between the two countries.

Combining these three aspects, bilateral trade flows could be explained by the following equation:

(1) $$X_{ij} = e^{\beta_0'} \frac{E_i^{\beta_1'} M_j^{\beta_2'}}{R_{ij}^{\beta_3'}}$$

The coefficients (β_i) are interpreted as elasticities of bilateral export flows with respect to the three factors of influence.

Potential supply of exports (E_i) is a positive function of the exporter's income level (measured by absolute GDP: Y_i), which can also be interpreted as a proxy for the range of product varieties available and a negative function of the country size, measured by population (N_i), which indicates the degree of self-sufficiency of a country (larger countries are more self-sufficient than smaller ones):

(2) $$E_i = e^{\beta_E} \frac{Y_i^{\beta_1}}{N_i^{\beta_2}}$$

Potential demand for imports (M_j) is a positive function of the importer's income level (measured by absolute GDP: Y_j), which again implies also demand for product variety and is a negative function of the country size, measured by population (N_j) indicating the degree of self-sufficiency and of specialization (the larger an importer the less dependent it is on imported goods):

(3) $$M_j = e^{\beta_M} \frac{Y_j^{\beta_3}}{N_j^{\beta_4}}$$

The trade-resistance factor (R_{ij}) is a negative function of all possible trade cost factors (transportation costs, border controls, tariff and non-tariff barriers, proxied by a distance variable: D_{ij}) and a positive function of various kinds of trade preferences (P_{kij}: dummy variable representing the k^{th} preference relationship between countries i and j; examples: membership in integration areas like EU, $EFTA$, EEA, $NAFTA$ etc.; other positive factors stimulating bilateral trade like common borders (adjacency or $BORD$) or common language ($LANG$)):

(4) $$R_{ij} = e^{\beta_R} \frac{e^{\sum_k \gamma^k P_{kij}}}{D_{ij}^{\beta_5}}$$

Putting all these components together one gets the following nonlinear gravity equation:

(5) $$X_{ij} = e^{\beta_0} \frac{Y_i^{\beta_1} Y_j^{\beta_3} e^{\sum_k \gamma^k P_{kij}}}{N_i^{\beta_2} N_j^{\beta_4} D_{ij}^{\beta_5}}$$

or

(6) $$X_{ij} = e^{\beta_0} Y_i^{\beta_1} N_i^{-\beta_2} Y_j^{\beta_3} N_j^{-\beta_4} D_{ij}^{-\beta_5} e^{\sum_k \gamma^k P_{kij}}$$

The signs of the coefficients (β, γ) indicate the positive or negative influence of that variable on bilateral trade flows.

This gravity equation has been estimated in different variants. First of all the nonlinear equation (6) is linearized by expressing it in natural logarithms:

$$(7) \qquad \ln X_{ij} = \beta_0 + \beta_1 \ln Y_i - \beta_2 \ln N_i + \beta_3 \ln Y_j - \beta_4 \ln N_j - \beta_5 \ln D_{ij} + \sum_k \gamma^k P_{kij}$$

In this traditional specification the gravity equation has the above interpretation and was used to estimate bilateral trade flows by *Linnemann* (1966), *Wang - Winters* (1991), and *Hamilton - Winters* (1992) as well as by many others (*Bergstrand* (1985) omitted the population variable).

Equation (7) can easily be reformulated to get a somewhat different interpretation, if one introduces per capita income terms in the exporting and importing country:

$$(8) \ln X_{ij} = \beta_0 + \beta_2 \ln\left(\frac{Y_i}{N_i}\right) + (\beta_1 - \beta_2) \ln Y_i + \beta_4 \ln\left(\frac{Y_j}{N_j}\right) + (\beta_3 - \beta_4) \ln Y_j - \beta_5 \ln D_{ij} + \sum_k \gamma^k P_{kij}$$

or equivalently

$$(9) \ln X_{ij} = \beta_0 + \beta_1 \ln\left(\frac{Y_i}{N_i}\right) + (\beta_1 - \beta_2) \ln N_i + \beta_3 \ln\left(\frac{Y_j}{N_j}\right) + (\beta_3 - \beta_4) \ln N_j - \beta_5 \ln D_{ij} + \sum_k \gamma^k P_{kij}$$

The dummy variables for distance and preferences have the same meaning as in equation (7). The other right-hand-side variables in equations (8) and (9), however, can be interpreted as follows (see *Bergstrand*, 1989, *Baldwin*, 1994):

(i) The exporters' per capita GDP (Y_i / N_i) is a proxy for its capital-labour ratio. This Heckscher-Ohlin-type interpretation stems from Bergstrand (1985). An increase in the GDP per capita raises its capital endowment relative to labour. This inference comes from the Rybczynski theorem.

(ii) The importers' per capita GDP (Y_j / N_j) is an indicator for the sophistication of demand in the importing country. The coefficient on the importer's per capita income

is its income demand elasticity. If its value is greater than unity, imported goods are so-called luxury goods, if it is less than unity they are so-called necessities.

(iii) The other variables measure the size of the countries, either by absolute GDP (Y) in equation (8) or by population (N) in equation (9) in the exporting and in the importing countries. In all cases the coefficients have a positive sign of the same magnitude.

The gravity equations in the specification of equation (8) or (9) have been used by *Bergstrand* (1989) and by *Schumacher* (1997) for a sectoral approach, and by *Baldwin* (1994) for an aggregate approach.

Although considerable attempts have been undertaken to underpin the gravity approach with standard and modern international trade theory (as one of the most prominent exponent one can mention *Bergstrand* (1985, 1989), when it comes down to econometric estimations, the theoretically postulated variables (e. g. capital-labour ratio or trade costs, tariffs) are approximated with the same simple aggregate variables (income, per capita income, population, distance, preference dummies) as at the beginning of the research in that field. Furthermore, the gravity equation, having the same empirical meaning, can be interpreted by different theoretical flavor (see the specifications in (7) to (9)).

However, different targets can be designated with the gravity setting. On the one hand, one can either use the standard equation (our equation (7)) or the „generalized gravity equation" (*Bergstrand*, 1985, 1989) in order to explain empirically bilateral trade flows for a chosen set of countries. On the other hand, one can focus on forecasts or predictions of potential trade flows for countries (e. g. potential East-West trade after opening up of Eastern Europe).

The standard-type model is justified as a reduced form from a four-equation partial equilibrium model of export supply and import demand. Prices are always excluded since they merely adjust to equate supply and demand (*Linnemann*, 1966, p. 41, *Bergstrand*, 1985, p. 474). *Bergstrand* (1985, 1989) uses a general equilibrium model of world trade

derived from utility- and profit-maximizing agent behavior in order to derive a partial equilibrium (bilateral relationship) of a „generalized gravity equation" which explains the value of trade flows (X_{ij}) by the usual income variables but additionally by transport costs, relative prices and exchange rates[2]).

The most common method of the gravity estimation was the cross-section approach for one given year or an average of years. More recently, the gravity type models have been criticized of being misspecified from an econometric point of view (see *Mátyás*, 1997)[3]). He proposes a panel data or pooled-regression approach, in which cross-country variables are combined with country-specific variables. Using our standard-type model of equation (7) this would imply a triple-indexed gravity model :

(10)

$$\ln X_{ijt} = \alpha_i + \gamma_j + \lambda_t + \beta_1 \ln Y_{it} - \beta_2 \ln N_{it} + \beta_3 \ln Y_{jt} - \beta_4 \ln N_{jt} + \beta_5 \ln RER_{ijt} - \beta_6 \ln D_{ij} + \sum_k \gamma^k P_{kij}$$

In Mátyás' (1997) specification X_{ijt} is the volume of trade (exports) from country i to country j at time t. He estimated his gravity equation for the volume of exports, in the 11 APEC[4]) countries for the period 1982-94. Y_{it} (Y_{jt}) is the GDP in country i (country j) at time t. N_{it} (N_{jt}) is population in country i (country j) at time t. RER_{ijt} is the real exchange rate between countries i and country j at time t. Explicitly he does not use the distance and preferential variables or dummies we have used in our equation (7). Additionally he uses as explanatory variable FCR_{jt}, the foreign exchange reserves of country j at time t. α_i is the local country effect (unity-dummy for countries as exporters);

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2) *Oguledo - Macphee* (1994) derive the gravity model from a linear expenditure system.

3) Mátyás focused on problems of incorrect interpretation of preferential trade dummies and improper economic inference.

4) Asia-Pacific Economic Cooperation.

γ_j is the target country effect (unity-dummy for countries as importers); λ_t is the time (business cycle) effect.

Without any doubt panels are a good (maybe the best) tool to estimate gravity equations and thus bilateral trade flows. In panel estimations group dummies (for export country, import country, and time) are introduced (see *Mátyás*, 1997)[5]) that make the isolation of integration effects from country effects possible[6]). Nevertheless panels are not helpful for the projection of trade potentials for Central and Eastern European Countries. The country specific group effects would - in the case of inclusion of CEEC in our estimation sample - generally result in an underestimation of trade potentials, because the dummy variables for CEEC would absorb those countries' structural backwardness effects and not allow for a projection of this component (the introduction of Eastern European countries in our estimation sample would not cause problems concerning the coefficients for the regressors while it would cause dramatic changes in the coefficients in the cross-section OLS estimation). An exclusion from the sample, on the other hand, would be just as problematic. Then one should have an answer on the question, which country specific effects the CEEC in general belong to. If one tries to forecast medium-term trade potentials such as those between Western European countries and Central and Eastern European Countries, one implicitly makes the assumption that the trade flows of the countries taking part in the estimation sample represent something like a steady-state, the other countries want to converge to. This procedure implies something like an absolute convergence hypothesis in levels. Both, the random effects model (which is rejected by the Hausmann statistics in our case) and the fixed effects approach depend heavily on the influence of the group effects (so that forecasts could be made just for countries within the sample. But, as

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[5]) The only possibility would be a dynamic panel approach using first differences of variables to avoid the influence of fixed effects.

[6]) Mátyás underpins that only a fixed effects panel approach makes a correct interpretation of trading bloc dummies possible. However, thus far panel models are not in use in the context of projections of trading potentials.

a consequence, one could just calculate the deviation of trade flows between OECD countries and CEEC in the status quo, which on the average should not be much greater than that of OECD countries alone. If one had no idea about the evolution of the group effects (in addition to that of the regressors), one could not calculate medium-term potentials. For the purpose of the estimation of medium-term trade potentials for countries in very different stages of development (or out of the sample), such arguments favor a cross-section estimation. In order to eliminate cyclical deviations of the variables from their (assumed) common steady-state one should (as we did) use averaged data over a certain period.

2.2 Data and Empirical Implementation

Trading Partners

The coverage of countries included in the estimation sample in gravity equations varies: *Bergstrand* (1985, 1989) uses 15 and 16 OECD countries. *Wang - Winters* (1991) include 76 countries (19 industrial and 57 developing) in their sample. A similar coverage (70 countries of which 22 OECD countries and 48 developing countries) *Schumacher* (1997) chooses. *Baldwin* (1994) estimates a random effects panel among the EC and EFTA nations and between these nations and the United States, Japan, Canada and Turkey. *Mátyás* (1997) uses 11 APEC countries for his fixed effects panel regression.

Our sample includes 24 OECD countries (Belgium and Luxembourg are treated together). The reason is that we think the OECD countries to reflect a kind of steady-state the Central and Eastern European Countries are converging to. Thus, the estimated coefficients from those equations are - at least in the medium term - representative for the CEEC as well, so that one could make use of them in order to forecast the trade potential in Eastern Europe.

Time period

If one only uses one specific base year the data could be biased by many systematic (exchange rate changes) or accidental factors (strikes, statistical errors, etc.). *Bergstrand* (1985, 1989) employs different base years in his estimations. In the recent literature it is common to take averaged data over several years: *Schumacher* (1997) the years 1988 to 1990; *Wang - Winters* (1991) as well as *Hamilton - Winters* (1992) an average for their data set over the period 1984-86. *Baldwin* (1994) used data for the period 1979 to 1988.

Our data sample contains averages over the period 1990 to 1994 for OECD countries (in estimation) and 1993 to 1994 for Eastern European countries (just for projection). We did not take the data for 1995 which are already available because in 1995 the EU enlarged by Austria, Finland and Sweden.

Variables in the gravity equation

Exports versus imports: Many authors rely more on the import data (see *Bergstrand,* 1985, 1989, *Wang - Winters*, 1991, *Hamilton - Winters*, 1992) on the assumption that most countries monitor their imports more carefully than their exports. This is particularly true if one includes developing countries. *Baldwin* (1994) would have preferred import data but in the end he employed export data because he wanted to deflate them.

In our estimations we apply the export data of the OECD (Monthly Foreign Trade Statistics, Series A), IMF (Direction of Trade) and of the UN (World Trade database; implemented in WIFO), because export data for OECD countries are trustworthy.

Real versus nominal variables: The gravity equation is neither a pure supply nor a pure demand function. It is a hybrid solution for bilateral trade flows. Whether the trade flows should be measured in volumes (real terms) or in values (nominal terms) is an open question. If one applies volumes, one should also deflate the dependent variable income (GDP). *Baldwin* (1994) employs real bilateral trade flows using price indices published by

Eurostat. Nevertheless, price data for trade flows are notoriously bad. *Bergstrand* (1985, 1989), in his derived „generalized gravity equation" chose values of trade flows. However, he needs complex price terms as explanatory variables together with exchange rate changes. Because price data for trade flows (in particular for bilateral flows) are obviously bad (or not existent) one has to approximate them (aggregate price or unit values for bilateral prices; aggregate wholesale price indexes; see *Bergstrand* (1985, 1989).

In our setting we used values of bilateral export flows, measured in million US dollars at current prices and current exchange rates. By averaging the data over the time period 1990 to 1994 the influences of exchange rate changes and other relative price change may be minimized.

Explanatory variables

GDP and population: Some authors employ nominal GDP measured in PPP (see *Baldwin,* 1994), others use GDP in US dollars because this variable should represent expenditures (at least in the importing country; see *Bergstrand,* 1985, 1989, *Wang - Winters,* 1991, *Hamilton - Winters,* 1992). If one's focus lies on the estimation (and not the prediction) of bilateral trade flows, it is not important whether one deals with real or nominal variables on both sides of the equation. If, however, prediction is one's goal, e. g. of potentials in Eastern Europe (as did *Baldwin,* 1994), one could get an upward bias in the trade potentials, because the levels of GDP and per capital GDP measured in PPP are much higher in the Eastern European countries than GDPs measured at current prices and current exchange rates.

We preferred GDP data in million US dollars at current prices and current exchange rates, taken from OECD (National Accounts, NA1, Volume II, Paris 1997; OECD, Main Economic Indicators; OECD, Economic Outlook, several issues). Data for population (in 1,000 persons) come from IMF (International Financial Statistics; and WIFO). Per capita GDP is calculated by dividing GDP by population (US dollars).

Distance: The measurement of trading costs is a difficult issue in the gravity model analysis. Usually one approximates the trade costs by measuring a straight-line distance between capitals (*Baldwin*, 1994) or by differentiating between sea and land distances (see *Bergstrand*, 1985, 1989).

In our approach we employ the same method for all countries, measuring distance generally between capitals, except for Australia (Sydney), USA (Kansas City), Italy (Milano) and Germany (Frankfurt) by the following method (see also *Schumacher*, 1997, p. 9):

$$(11) \qquad D_{ij} = r.\arccos\left[\sin(\varphi_i).\sin(\varphi_j) + \cos(\varphi_i).\cos(\varphi_j).\cos(\lambda_j - \lambda_i)\right]$$

r = earth radius (3962.07 miles),
φ_i, φ_j = radian measure of parallel of latitude of the two countries' capitals and
$\lambda_j - \lambda_i$ = radian measure of the difference in meridians of the two countries´ capitals.

Dummy variables: The dummy variables for *preferential trade* arrangements vary with the coverage of countries. Those authors (like *Wang - Winters*, 1991 and *Hamilton - Winters*, 1992) which include industrial and developing countries employ not only the European free trade arrangements (EC, EFTA, EEA) but also other arrangements in Africa, Asia and Latin America. *Baldwin* (1994) covering only industrial countries uses one dummy for the EEA which contains all EC and EFTA countries. Some authors apply explicitly tariffs in order to capture the degree of liberalization (see *Oguledo - Macphee*, 1994).

In our estimations we take into account the whole range of free trade arrangements possible in the OECD countries (EC, EFTA, EEA and NAFTA).

In addition to trade preferential dummies one often employs dummies for common borders (sometimes called „adjacency" or in our terminology *BORD*). Also a common language (dummy *LANG*) can make trade relations easier. Both dummies are included in our estimations. In all cases the dummies take the value 1 where preferences apply and 0 otherwise. In the case of Switzerland - although Italian and French are spoken in this country too - we reduced the language dummy to only German.

2.3 Estimation of the Gravity Equations

As we are interested in the forecasting power of the gravity equation we start by estimating „all" possible specifications (equations (7) to (9)) in a cross-section approach.

In *table 1* we present the coefficients for the specifications of the gravity equations (7) to (9) in two variants. First of all the standard variables (nominal GDP (Y), population (N), nominal per capita GDP (Y/N) and distance ($DIST$)) were included. In addition all possible preferential dummies were employed: $EU12$, $EFTA$, $EEA18$, $NAFTA$, $BORD$, $LANG$. However, in several combinations of bilateral trade flows (e. g. Australia with Iceland; Iceland with Ireland; Iceland with Austria and Iceland with Turkey) we found a considerable mismatch between exports and imports. Therefore we implemented special dummies for these rare cases[7]), because the mirror statistics of trade flows (comparison of bilateral export with import flows) show rather divergent values for the above mentioned countries.

In the first variant of each specification (7), (8) and (9) we included the dummies $EU12$ and $EFTA$ separately, in the second variant of each equation (7a), (8a) and (9a) we employed only one single trade preferential dummy for Europe ($EEA18$). In reality the EEA includes 15 EU countries and three EFTA countries (Iceland, Norway and Liechtenstein). Switzerland, in a referendum in December 1992 refused the EEA treaty and was therefore

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[7]) In addition to that we introduced an outlier dummy for trade flows from Iceland to Australia. According to the test suggested by *Judge et al.* (1988, chapter 22) our procedure is justified. The residuals for the bilateral trade flows of these countries exhibited rather high values. The five outliers showed the highest studentized residuals (above an absolute of 3) in the sample. DFFITTS are high as well, and many DFBETAS show noticeable effects on the coefficients for those flows. Because we used special dummy variables for the data outliers for some bilateral trade relations (export flows from: Australia to Iceland, Iceland to Ireland, Iceland to Austria, Iceland to Australia, Iceland to Turkey) one must take into account the following bias. While a dummy variable that takes the value 1 for only one observation equals the deletion of that observation from the least squares computations, one should be careful in omparing the the R^2 statistics (1-RSS/TSS) with that in other studies, because it is artificially pushed up by such a strategy as RSS/TSS becomes smaller (see *Greene*, 1997, p. 372).

excluded from the EEA. However, Switzerland via the free trade agreements of 1973 with the European Communities has - as the other EFTA countries - reoriented its trade flows towards the EU. EU membership, EEA participation and EFTA status should have similar effects for the EEA intra-trade flows. Therefore, in the dummy variable $EEA18$ we treated Switzerland as a EEA member. As Liechtenstein is included in the foreign trade statistics of Switzerland we have 18 EEA countries captured in our EEA dummy. In equation (9b) we used the dummy for $EU12$ only.

As mentioned above, we employed a cross-section estimation approach. The estimation technique was OLS with White-Heterosketasticity-Consistent Standard Errors and Covariance corrections. We primarily focus on the qualification of the gravity approach (in levels) for predictions of trade potentials in Central and Eastern Europe in case of opening-up of trade and in case of EU enlargement.

Estimation results

First, the separation of the preferential dummies in $EU12$ and $EFTA$ (equations (7), (8) and (9)) was not successful. The coefficient for the $EFTA$ dummy has a negative sign and is insignificant. One reason may be that this dummy variable only emphasizes the intra-EFTA trade. This, however, slowed down considerably in the period of observation either due to the long-run effects of the free trade agreements between EC and EFTA in 1973 or due to the EEA arrangement, coming into effect in 1994. The use of only one dummy for intra-EEA trade ($EEA18$) resulted in a significant coefficient (equations (7a), (8a) and (9a)).

Second, because there is some correlation between the dummy for common borders ($BORD$) and common language ($LANG$) in our data (0.38) this might lead to some multicollinearity. It turns out that the regressors Baldwin (1994) used in his work fit best also our data sample, although we used a different time period and different specifications of the data (and a different estimation technique as well). Therefore, if both dummies are included, one of them is not always significant.

Table 1: Gravity Equations Coefficient Estimates for Aggregate OECD Countries Trade Flows (OLS with White Heteroskedasticity-Consistent Standard Errors and Covariance)[1)]

Explanatory Variables	EQ7	EQ7a	EQ8	EQ8a	EQ9	EQ9a	EQ9b
Constant	5.51 (10.82)	2.92 (3.33)	-2.63 (2.78)	-1.71 (1.94)	-24.13 (25.47)	-24.60 (23.63)	-24.08 (25.73)
Exporter's GDP per capita (Y_i / N_i)			0.57 (9.00)	0.44 (6.83)	1.32 (22.36)	1.24 (20.83)	1.32 (22.59)
Exporter's GDP (Y_i)	1.32 (22.31)	1.24 (20.78)	0.75 (32.91)	0.80 (34.33)			
Exporter's population (N_i)	-0.57 (8.97)	-0.44 (6.78)			0.75 (32.94)	0.80 (34.35)	0.76 (35.14)
Importer's GDP per capita (Y_j / N_j)			0.02 (0.33)	-0.10 (1.68)	0.82 (14.27)	0.75 (13.38)	0.82 (14.45)
Importer's GDP (Y_j)	0.82 (14.22)	0.74 (13.31)	0.80 (30.30)	0.85 (32.14)			
Importer's population (N_j)	-0.02 (0.30)	0.11 (1.72)			0.80 (30.33)	0.85 (32.16)	0.81 (31.81)
Distance between capitals (D_{ij})	-0.74 (20.19)	-0.63 (10.42)	-0.74 (20.16)	-0.63 (10.44)	-0.74 (20.15)	-0.63 (10.35)	-0.75 (22.72)
EU12 dummy	0.42 (5.29)		0.42 (5.29)		0.42 (5.28)		0.42 (5.39)
EEA18 dummy (EU+EFTA)		0.52 (3.67)		0.52 (3.67)		0.53 (3.71)	
EFTA dummy	-0.05 (0.31)		-0.05 (0.31)		-0.04 (0.28)		
NAFTA dummy	0.88 (5.67)	0.87 (5.36)	0.88 (5.68)	0.87 (5.37)	0.88 (5.69)	0.87 (5.39)	0.97 (6.63)
Border dummy $(BORD)$	0.15 (1.17)	0.23 (1.76)	0.15 (1.17)	0.23 (1.76)	0.15 (1.18)	0.24 (1.79)	
Language dummy $(LANG)$	0.77 (5.94)	0.80 (5.97)	0.77 (5.93)	0.80 (5.96)	0.77 (5.91)	0.80 (5.95)	0.82 (6.99)
R^2	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adjusted R^2	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Observations	506	506	506	506	506	506	506
Log-Likelihood	-506.28	-510.16	-506.06	-510.00	-505.42	-509.02	-506.09
Jarque-Bera	0.71	0.72	0.73	0.76	0.75	0.87	0.39

Notes: 506 observations; t-statistics in parentheses; EU12 (EFTA, EEA18 and NAFTA) are dummy variables which take the value 1 whenever both countries are members of the EU12 (EFTA, EEA18 and NAFTA) and 0 otherwise. BORD (adjacency = common borders), LANG (common language). While the 1st and the 2nd column show equations of the Wang - Winters type (including GDP, population), columns 3 to 6 give the results using two versions of the gravity equation which Baldwin used (with GDP/capita instead of GDP). - 1) In order to capture the largest mismatches of the export and import data dummy variables were used in the estimated equations for exports from Australia to Iceland, from Iceland to Ireland, from Iceland to Austria, from Iceland to Australia, and from Iceland to Turkey. Such a strategy pushes the R^2, so that one should be careful in comparing our estimations with those of other authors.

Third, the original specification of the gravity equation (our equation (7)) yields rather bad results regarding the basic variables for income (Y) and population (N). The variable for the importers' population resulted in either the wrong sign and/or was insignificant. This result contrasts sharply with the findings by Wang and Winters (1991) or Hamilton and Winters (1992) for the same type of gravity equation. However, the explanation for our results may be found in the fact that absolute GDP and population is highly correlated (0.94) in our data sample of industrial countries. Therefore the specification of equation (7) yields a high degree of multicollinearity in the estimation of both variables included. The good fit of *Wang - Winters* (1991) and *Hamilton - Winters* (1992) may be explained by the fact that they included more developing countries than industrial countries, and hence reduced multicollinearity between GDP and population.

Similarly, multicollinearity is present if one applies a specification with per capita income (Y/N) and absolute GDP (Y) (equation (8)). In this case the estimated coefficient for the variable for per capita income of the importer has either the wrong sing and/or is insignificant.

Fourth, the best specification for our data sample is one with per capita income (Y/N) and population (N) (equation (9)). *Baldwin* (1994), having employed a similar set of industrial countries, came to the same conclusion. The reason for the superiority of the statistical fit of this approach is that the multicollinearity problem between the above mentioned variables is avoided. Again, the specification with separated dummy variables for EU and EFTA was not successful (equation (9)). All other preferential variables are included. Therefore we have chosen two variants of equation (9).

In one variant (equation (9a)) we introduced one trade preferential variable for trade in Europe ($EEA18$). Again all other preferential variables were employed. In the other variant (equation (9b)) we introduced only the dummy for intra-EU12 trade ($EU12$) and excluded that one for common borders ($BORD$). For the purpose of estimating trade potential in East and West we have chosen therefore the coefficients of our equations (9a) and (9b) of *table 1*.

3. Empirical Results

3.1 Are Estimated Gravity Equation Coefficients Good Trade Flow Predictors for West-West Trade?

In trying to reproduce and improve the work by *Wang - Winters* (1991), *Hamilton - Winters* (1992) and *Baldwin* (1994), first, we concentrated our work on the careful specification of the gravity equation given our chosen data sample for the period 1990 to 1994. Then, before making the next step done by the mentioned authors, namely to estimate the potential of the East-West trade flows we started with a control estimation of the bilateral trade flows for the countries included in the estimated sample, namely the OECD countries. For this purpose we only used equations (9a) and (9b) which exhibited the best statistical fit (see *table 1*).

The ex-post projection of bilateral trade flows with the estimated coefficients of our equations revealed the „shocking" discovery that they are extremely weak predictors for absolute trade potentials[8]). First, the estimation results are highly sensitive to changes in the dummy variables, and, second, the confidence intervals of the estimated trade flows are so huge that any reliable statement about the trade potentials derived from gravity equation exercises are impossible. This is particularly disappointing for the case of East-West trade.

Dummy variable sensitivity

By varying slightly the language dummy in the case of Switzerland - in one case only with German (see the results in *table 1*), in the other case with three languages (German, French and Italian; estimated equation not reported here) - the estimated coefficients (the constant included) remained the same up to the second decimal after the comma in the

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[8]) This point is already addressed by *Gros - Gonciarz* (1996, p. 714).

case of the basic variables (income, per capita income, population, distance, border, EU12 dummy and EEA18 dummy). Only the coefficients for the other dummies changed. The values of the coefficients for *NAFTA* decreased from 0.97 to 0.87 in the case of equation (9a) and from 1.07 to 0.97 in equation (9b) respectively. The coefficients for common language (*LANG*) increased from 0.68 to 0.80 and from 0.72 to 0.82. This change was enough to deliver completely different results from the bilateral trade flows.

Table 2a: Actual and Potential Trade Flows within Western Europe (CH - German-LANG)

Table 2b: Actual and Potential Trade Flows within Western Europe (CH - German, French, Italian LANG)

In *table 2a* potential and actual trade flows are confronted for aggregate trade flows within Europe. If EU12 exports to EU12 equation (9b) would imply a relationship between potential and actual exports of 1.13 (that means that the trade potential in intra-EU12 trade would be higher by 13% than actual trade flows). In the case of equation (9a), however, the trade potential would be 6% below the actual export flows (relationship 0.94). If the area of demand is increased (from EU12 to EU15, to EU18 and EU19) then the potential for the export region increases. Already in this case we see that the inclusion of different preferential dummies (EU12 in the case of equation (9b), and EEA18 in the case of equation (9a)) - although both equations have an excellent statistical fit - result in a different message: in one case (equation (9b)) with only the EU12 dummy one would conclude that there is still room for additional intra-EU trade, whereas in the other case (equation (9a)) with the EEA18 dummy the actual trade flows have already exhausted the trade potential. The same statement applies if one expresses the difference between potential and actual export flows in % of GDP (see second part of *table 2a*).

The picture gets even more confused when one uses the same specifications as before but only changes for one country (Switzerland) the language dummy. The estimation results of aggregate export potentials within Europe are documented in *table 2b*. In this case both equations (9a) and (9b) result in trade potentials which are below the actual trade flows. This contrasts with the results of *table 2a*. It seems that the results are more sensitive to changes in the Switzerland language dummy in the case of equation (9b) than in those of

equation (9a). Nevertheless, the question remains: which then is the 'true' general equilibrium steady state trade potential? It simply cannot be answered[9]).

Table 3a: Change in Export Quotas due to EU Enlargement (CH - German-LANG)

Table 3b: Change in Export Quotas due to EU Enlargement (CH - German, French, Italian LANG)

This very divergent picture in the case of trade flow aggregates is even more pronounced on the country level (see *tables 3a* and *3b*). If one picks Belgium-Luxembourg for example one can either conclude that they still have a huge trade potential (*table 3a*) or that their actual trade flows already are above the general equilibirum values forecasted by the gravity equation (*table 3b*). In addition to that one message of the empirical application is, that, at the country level (not on the average!) persistent deviations of actual from potential exports could have persistent character. In any case these tables show that the enlargement of EU12 to EU15 by Austria, Finland and Sweden led to a jump in the trade potential for those countries in the case of equation (9b) which only includes the EU12 dummy. Accordingly, if new EU members get access to the EU single market their dummy values for trade with the EU jump from 0 to 1 and hence increase trade potential equivalently to the dummy parameter value (0.43 or 54% of actual trade flows). As this seems a rather strong trade creation effect for EFTA countries which already had tariff-free access to the single market (free trade agreements in 1973 and EEA participation since 1994) it seems more adequate to use equation (9a) which already captures the trade involvement of the all EFTA countries with the EU (also for the data period 1990 to 1994) in the EEA18 dummy. Mechanically in *tables 3a* and *3b* we added the three resting EFTA countries (Iceland, Norway and Switzerland) to EU15 to get a hypothetical enlarged EU18. If one adds also Turkey one has EU19.

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[9]) The Swiss multilanguage case is, however, not the only one in the OECD area. Similar arguments hold for Canada and Belgium. Equivalent problems could arise for the common border dummy.

Some countries stand out from the general picture. In particular this is true for Ireland and Switzerland. The prediction of the intra-EU trade potentials of Ireland reveal that this country has already exhausted its trade potential by around 20% of GDP. The reverse is true for Switzerland for which an unexhausted trade potential in intra-EU trade is estimated at a similar amount. An EU accession would double this potential to over 40% of GDP! This extreme results are very difficult to explain. The fact that the gravity equation is estimated in absolute values could explain the very bad predictions for the levels of trade flows in the case of small countries. Other examples (like Iceland, Austria etc.) would, however, contradict this suspicion.

In *tables 4a* and *4b* we show the ratios of potential to actual bilateral trade flows of OECD countries calculated with equations (9a) and (9b). There we only present the results with the parameters from the gravity equations of *table 1* (i. e., Switzerland includes in its language dummy only German) in use. The results can be interpreted in two ways: first, in an ideal world the gravity equation should exactly reproduce the actual trade flows. If there are divergencies of predictions from the actual values this indicates that the equation did not capture all country specific factors which explain bilateral trade flows. Second, if the gravity equation captures the major factors influencing bilateral trade flows then estimations with it indicate something like a general equilibrium bench mark. Countries which exhibit a relation of potential exports to actual exports of less than one have already exhausted their trade potentials according to their comparative advantages. Countries where this relationship has a value of more than one seem not yet to have exhausted their comparative advantages properly. Which interpretation is the correct one is very difficult to decide.

Table 4a: Actual and Potential Bilateral Trade Flows of OECD Countries (Equation (9a))

Table 4b: Actual and Potential Bilateral Trade Flows of OECD Countries (Equation (9b))

Our results indicate that, first, the outcome is heavily dependent on the specification of the gravity equation, in particular concerning the preferential dummy variables. Estimations with equation (9a) of *table 1* which includes a broad European integration dummy $EEA18$

have a bias towards lower potential/actual export figures than estimations with equation (9b) with only $EU12$ as European integration dummy variable. It is tempting to interpret the results in the more trade theoretical way. This would lead to the conclusion that a rich EU country, like e. g. Germany, has already exhausted its trade potentials on the EU market due to its impressive comparative advantages. However, from a trade theoretical point of view it is difficult to interpret why poor European countries like Ireland and Portugal should already have exhausted their comparative advantages on the EU market even more than Germany! Even more confusing is the result that for some countries the relationship between potential and actual switches from over one to below one, depending on the gravity equation chosen (see e. g., Belgium-Luxembourg for their trade relations with EU19; also Denmark and United Kingdom).

As the gravity equation explains bilateral trade flows (either measured with export flows, as in our case; or with import flows), one can calculate hypothetical trade balances with this instrument. This exercise is done in the *tables 4, 5* and *6*. Here again, the predictions are calculated only with the estimated parameters of *table 1* (Switzerland with German in the language dummy).

Table 5: Actual and Hypothetical Trade Balances in Trade with Western Europe

In *table 5* the hypothetical trade balances of the Western European countries in trade with Western Europe are confronted with the actual balance with this trading area. Within the EU Germany, Ireland, Italy, the Netherlands and the United Kingdom have already a better performance (measured by the trade balance in % of GDP) than they would have according to the general equilibrium result of the gravity equations (here, both equations (9a) and (9b) give similar results). From the new EU members Finland and Sweden performed already better than the expected potential according to the gravity equations. Austria, however, should have a better (potential) trade balance with the EU (surplus) than it actually has (deficit). Switzerland, with a surplus in the total trade balance, exhibits a deficit in trade with Western Europe. The potential trade balance according to the gravity

equation would result in a surplus. Turkey, on the other hand, is actually better off than the gravity equations would predict.

A preliminary conclusion from the test of the predictive power of gravity equations for bilateral trade flows seems to be that our equation (9a) with the broader integration dummy for European integration ($EEA18$) is more robust to changes in other dummy specifications (e. g. in our case the language dummy for Switzerland). The results are similar in magnitude and have the same sign. That means that the predicted trade potential is more downward biased than it would be according to predictions with our equation (9b) which only includes the narrow integration dummy $EU12$.

3.2 Actual and Potential Trade Flows between West and East

Keeping in mind the considerable caveats of the gravity approach to predict the bilateral trade flows in general, one is more than uneasy in applying this instrument for the estimation of the potential of East-West trade. By using two alternative specifications (equation (9a) and (9b)), however, we calculated trade potentials between West and East. In effect, our projections leave beside any dynamics of the regressors (growth of GDP per capita or population). They only measure the degree of structural mismatch of East-West trade relations with respect to those between more developed countries (OECD).

Table 6a: The Development of West-East Exports between 1990 and 1995

Table 6b: The Development of West-East Imports between 1990 and 1995

Table 6c: The Development of the Trade Balance in West-East Trade between 1990 and 1995

Table 7a: The Development of East-West Exports between 1990 and 1995

Table 7b: The Development of East-West Imports between 1990 and 1995

Table 7c: The Development of the Trade Balance in East-West Trade between 1990 and 1995

Speeding up East-West Trade

West-East trade has developed quite considerable since the opening-up of Eastern Europe in 1989. The shares of trade with Eastern Europe have increased in most of the OECD countries between 1990 and 1995 (see *tables 6a, 6b*). Most of the OECD countries profited from the new trade possibilities in the East. The most noteworthy exception of this general trend is Finland. Due to the break-down of the trade relations with the former USSR Finland lost over 4 percentage points of total trade with the consequence of a severe recession in the following years. The trade balances of most of the Western countries with the East improved (see *table 6c*) considerably. In Eastern Europe a fundamental reorientation of trade set in after the dissolution of the COMECON (CMEA) and the Soviet Union. The share of trade with the CMEA declined, those with the EU increased considerably (see *tables 7a, 7b*). Many authors believe that most of the estimated trade potentials of West-East trade at the beginning of the opening-up process have been realized already (see *Gros - Gonciarz*, 1996).

Estimated Potentials for West-East Trade

Because we use a data base which already includes some catching-up effects (in the sense of a more and more market-like trade performance, and in terms of GDP per capita growth) of the CEEC, namely the period 1993 to 1994, our trade potentials should already be closer to the actual trade flows than earlier studies have found (see *Wang - Winters*, 1991, *Hamilton - Winters*, 1992, *Baldwin*, 1994). The strong reorientation of the trade of the Eastern European countries from East to West has, of course, also be stimulated by the Europe Agreements (EA) which the 10 CEEC signed with the EU. These agreements imply an asymmetric tariff reduction - faster for the EU imports from the CEEC than the other way round. In 1997 most of the tariffs for EU imports from the CEEC have already been eliminated. The CEEC have time to reduce the tariffs until the year 2000 for imports from the EU.

Table 8: Trade Potential versus Actual Trade from West to East (Equation (9a))

Table 9: Trade Potential versus Actual Trade from East to East (Equation (9a))

Table 10: Trade Potential versus Actual Trade from West to East (Equation (9b))

Table 11: Trade Potential versus Actual Trade from East to West (Equation (9b))

In a first step we simply used the parameters of the gravity equations (9a) and (9b) in order to predict the West-East and East-West export potentials. In a second step we calculated the possible effects of an EU enlargement, i. e. in the case of an EU accession of five CEEC (Czech Republic, Estonia, Hungary, Poland, Slovenia) as was proposed by the European Commission in its „Agenda 2000" on July 1997.

The EU15 as a whole seems to have already exhausted its trade potential with the CEEC, not so with the former Soviet Union. This result seems to be robust because both equations in use come up with the same message (the relationship between potential to actual exports is less than one; see *tables 8* and *10*). With the exception of Sweden both gravity equations deliver the same tendency for all EU countries. In particular Austria, Germany, Finland and Greece have already exported more than the predictions by the gravity equation would suggest. Portugal and Spain seem to exhibit still a huge export potential with the East. In the case of exports to the former Soviet Union most of the EU countries have still a considerable unexhausted potential. The EU15 as a whole could export 41% or 62% more than it did until now. Only Finland and Germany seem to have already used up their export potential to the former Soviet Union. The trade potentials with the individual countries of the Community of Independent States (CIS) differ widely.

Estimated Potentials for East-West Trade

The main messages from an application of equations (9a) and (9b) would be: Not only the actual West-East exports (EU15 with CEEC) have already surpassed the potential according to our gravity equations the same is true - even to a higher degree - in the case of East-West exports (see *tables 9* and *11*). Whereas some EU countries still have not completely exhausted their trade potential with the CEEC all CEEC have already to a considerable degree exported more than one could have expected by the hypothetical

trade flow predictions with the gravity equations. This asymmetry could well be a mirror image of the asymmetric trade liberalization process according to the Europe Agreements.

EU's Eastern Enlargement

Following the proposition of the „Agenda 2000" five CEEC could become EU members not earlier than in the year 2003. Using our dummy variables in the gravity equations (9a) and (9b) we can calculate the hypothetical enlargement effect when the Czech Republic, Estonia, Hungary, Poland and Slovenia will join the EU (see *tables 12* to *15*).

Table 12: Trade Potential versus Actual Trade from West to East: EU Enlargement by 5 CEEC (Equation (9a))

Table 13: Trade Potential versus Actual Trade from East to West: EU Enlargement by 5 CEEC (Equation (9a))

Table 14: Trade Potential versus Actual Trade from West to East: EU Enlargement by 5 CEEC (Equation (9b))

Table 15: Trade Potential versus Actual Trade from East to West: EU Enlargement by 5 CEEC (Equation (9b))

The eastward enlargement of the EU would increase the trade potentials of the West by 48% (EU15 exports to CEEC) according to gravity equation (9a) and 35% with equation (9b). In both cases the „trade creation effect" comes about only by using the preference dummy variables ($EEA18$) or ($EU12$). It is, however, questionable whether such a big jump in trade potential will be feasible in addition to the already dramatic increase since 1990. With the Europe Agreements a large part of the trade effect of an EU accession has already been consumed. An additional long-run trade effect could result from the convergence of the income levels of the CEEC with those in the West. These trade effects due to a possible catching-up in the income levels have not been calculated explicitly. If, however, one takes additionally into account that the GDP per capita in the CEEC is only half of that of the EU a doubling of per capita income would (c. p., according to the parameter in gravity equation (9a) in *table 1* - 0.75) result in an additional trade potential for the EU countries by 75%. The EU enlargement would have no impact on the CIS.

An EU enlargement by 5 CEEC would result in an increase in the potential to export in the EU15 by 55% (equation (9a)) or 43% respectively (equation (9b)). Again, we see the

asymmetric effect. The trade potentials of the CEEC10 increased more than those of the EU15. Clearly, the individual candidates for EU accession will have an even higher increase in their trade potentials than the average of CEEC10, and the CIS will not be influenced by trade creation effects of the CEEC in such a setting.

3.3 Confidence Intervals: How Reliable are Trade Potential Level Predictions?

In order to demonstrate the weak prediction performance of the gravity equation to predict trade flow levels we calculated confidence intervals for bilateral trade potentials (fitted values and predictions for countries within and outside the estimation sample) at the 95% level. The estimated variance of the forecasted values is calculated as follows[10]):

(12) $$Var = s^2\left[1 + x_i^{0\prime}\left(X'X\right)^{-1}x_i^0\right]$$

where,

X = regressor matrix,

x_i^0 = vector of regressor for one observation (bilateral trade flow) and

s^2 = estimated variance of OLS estimation.

The regression coefficients from the estimation sample were used as well to calculate the standard errors for the bilateral trade flows of Central and Eastern European Countries. The forecast interval is (see *Greene*, 1997, p. 369)

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[10]) On the one hand model specification theory tells us that omission of variables yields biased estimators and upward-biased variance (but the sampling variability of the biased estimator is smaller than that of the biased one). (see *Judge et al.*, 1988, p. 842). As the exclusion of any variable from our sample results in a loss of the goodness of fit, and the Akaike, Schwartz and adjusted R^2 criteria indicate that each of the introduced variables contain information that is not measured by the other regressors, the exclusion of any of them could not be justified from a statistical point of view. On the other hand, if the true model is a very rich one, and thus contains a lot of regressors, one yields a bigger design matrix X. Hence, $x_i^{0\prime}(X'X)^{-1}x_i^0$ becomes larger and the standard error of the predicted value should be a big one.

(13) $$FI = \hat{y}_i^0 \pm t_{\alpha/2} s(\hat{y}_i^0)$$

where,

$\hat{y}_i^0$ = fitted exports between two countries (observation *i*),

$s(\hat{y}_i^0)$ = standard error of forecast for observation *i and*

$t_{\alpha/2}$ = t-value of the corresponding probability level (1.96 for the 95% level).

Clearly, the width of the interval (thus uncertainty) is greater, the farther the elements of the regressor vector x_i^0 from the center of the data. As the equations were estimated in logarithmic form, for which the residuals were normal distributed, we got symmetric intervals for logarithmic potentials. However, the exponent of the limits around the potential yields a heavily confidence funnel for potential values, because the variance and distribution function in that case follow the lognormal distribution function (see *Greene,* 1997, p. 71). To cover that aspect we not only calculated the span between the upper and lower limit as a percentage of the fitted potential, but also separately that one between the upper limit and the potential and between the lower limit and the potential (both as percentage of the fitted value).

Table 16: Confidence Intervals for Estimated Trade Flows with Gravity Equations

The upper prediction limit is around 280% of the effectively predicted trade flows for intra-OECD trade and around 290% for East-West trade. The lower limit is around 74% for West-West and for East-West trade (see *table 16*). Such a huge confidence spread (in total between 350% and 360% of the predicted values) makes any serious conclusion about absolute trade potentials derived from gravity equations of the common type meaningless.

In the end we have several sources of unreliability in the prediction of absolute trade potentials with the gravity setting. One is the high „dummy variable sensitivity". This includes, on the one hand, the sensitivity of the results from a small alteration in one dummy (e. g.; the Swiss language dummy case in our example) and, on the other hand, from the selection of the relevant preferential dummies in general (see our differentiation

between equation (9a) and (9b), where EEA18 or EU12 are introduced to reflect the effects of European integration). The other source of unreliability stems from the „huge confidence intervals" surrounding the estimated export potentials. All together makes the gravity equation a very fragile and questionable instrument to predict potential levels of trade flows.

4. Conclusions

Gravity equations have been used repeatedly to explain bilateral trade flows and more recently to predict the East-West trade potential after the opening-up of Eastern Europe after 1989. Early studies, based on the gravity model approach have indicated a huge trade potential for the East and for the West in bilateral trade. The dramatic increase in actual trade between East and West after 1990 seems to indicate that most of the trade potential has already been realized. The trade liberalization process between the EU and the CEEC due to the Europe Agreement has stimulated this development. Applying a cross section estimation for OECD countries, we found that the corresponding calculations of export potentials (taking the coefficients of the two equations with the best fits) between EU countries and CEEC10 seemed to be already exhausted, but not those between the West and the CIS countries.

In order to check the predictive power of the estimations, we also made an ex-post evaluation of the intra-OECD bilateral trade flows. Doing so, we found that the results are very sensitive with respect to dummy variables. A change in only one country's language dummy (Switzerland) could either shift potential exports over actual exports or the other way round for intra-EU trade. Beyond that we showed that the stability of the results depends heavily on the preferential trade dummies introduced (some authors already suggested to avoid such problems by applying a fixed effects panel approach).

Finally, we provided insights in the prediction performance of cross section gravity equations (applied for level projections). For our data we found forecast interval spans between 350% and 360% in terms of the predicted values. Intervals of that size make any conclusions about absolute trade potentials suspicious.

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6. Appendix

Table 2a: Actual and Potential Trade Flows within Western Europe [1)]
(Exports of different EU aggregates to Europe19; average 1990 to 1994)

	Potential exports are estimated with:					
	Gravity equation (9a) Dummy variables:		Gravity equation (9b) Dummy variables:			
Exporter	EEA18	EEA19	EU12	EU15	EU18	EU19
	Relationsship: Potential exports/actual exports					
EU12	0,94	0,95	1,13	1,15	1,20	1,21
EU15	0,95	0,95	1,11	1,16	1,21	1,22
EU18	0,99	1,00	1,13	1,19	1,29	1,29
EU19	0,99	1,00	1,13	1,18	1,28	1,29
	(Potential exports - actual exports) in % of GDP					
EU12	-0,90	-0,82	1,87	2,28	3,04	3,12
EU15	-0,82	-0,73	1,59	2,48	3,24	3,31
EU18	-0,11	-0,02	2,03	2,88	4,36	4,44
EU19	-0,17	-0,05	1,94	2,77	4,22	4,32

1) Switzerland: Language dummy variable with German.

Table 2b: Actual and Potential Trade Flows within Western Europe [1)]
(Exports of different EU aggregates to Europe19; average 1990 to 1994)

	Potential exports are estimated with:					
	Gravity equation (9a) Dummy variables:		Gravity equation (9b) Dummy variables:			
Exporter	EEA18	EEA19	EU12	EU15	EU18	EU19
	Relationsship: Potential exports/actual exports					
EU12	0,98	0,99	0,95	0,97	1,01	1,02
EU15	0,99	0,99	0,93	0,98	1,02	1,02
EU18	1,06	1,07	0,97	1,02	1,11	1,11
EU19	1,06	1,07	0,97	1,01	1,11	1,11
	(Potential exports - actual exports) in % of GDP					
EU12	-0,25	-0,16	-0,80	-0,44	0,18	0,25
EU15	-0,18	-0,08	-1,08	-0,31	0,31	0,37
EU18	0,99	1,09	-0,45	0,28	1,68	1,75
EU19	0,91	1,04	-0,50	0,21	1,59	1,68

1) Switzerland: Language dummy variable with German, French and Italian.

Notes: EU12 = Belgium-Luxembourg (BE-LU), Denmark (DK), Germany (DE), Greece (GR), Spain (ES), France (FR), Ireland (IE), Italy (IT), Netherlands (NL), Portugal (PT), United Kingdom (GB).
EU15 = EU12 + Austria (AT), Finland (FI), Sweden (SE).
EU18 = EU15 + Iceland (IC), Norway (NO), Switzerland (CH).
EU19 = EU18 + Turkey (TR).
EEA18 = EU15 + Iceland (IC), Norway (NO), Switzerland (CH).
EEA19 = EEA18 + Turkey (TR).
In the years 1990 to 1994, the specifications EU15, EU18, EU19 are of course only hypothetical.

Table 3a: Change in Export Quotas due to EU Enlargement [1)]
(Exports of Western European Countries to Europe19; average 1990 to 1994)

Exporter	Potential exports are estimated with:					
	Gravity equation (9a) Dummy variables:		Gravity equation (9b) Dummy variables:			
	EEA18	EEA19	EU12	EU15	EU18	EU19
	(Potential exports - actual exports) in % of GDP					
Belgium-Lux. (BE-LU)	-5,24	-5,12	7,34	7,90	9,30	9,40
Denmark (DK)	-0,15	-0,01	5,60	6,55	7;25	7,38
Germany (DE)	-1,93	-1,84	-0,14	0,47	1,41	1,48
Greece (GR)	0,89	1,13	1,93	2,20	2,40	2,58
Spain (ES)	-1,41	-1,35	-0,47	-0,28	-0,08	-0,03
France (FR)	3,48	3,55	5,86	6,17	6,96	7,02
Ireland (IE)	-22,66	-22,56	-16,68	-16,25	-15,84	-15,75
Italy (IT)	1,55	1,64	3,42	3,77	4,96	5,04
Netherlands (NL)	-12,18	-12,08	-5,19	-4,72	-4,24	-4,14
Portugal (PT)	-8,87	-8,80	-7,66	-7,46	-7,27	-7,22
United Kindom (GB)	-1,01	-0,94	2,20	2,47	2,75	2,81
EU12	**-0,90**	**-0,82**	**1,87**	**2,28**	**3,04**	**3,11**
Austria (AT)	7,41	7,58	3,28	13,03	14,10	14,26
Finland (FI)	-1,59	-1,46	-2,95	3,01	3,44	3,56
Sweden (SE)	-4,72	-4,60	-6,00	-0,35	0,16	0,28
EU15	**-0,82**	**-0,73**	**1,59**	**2,48**	**3,24**	**3,31**
Iceland (IS)	0,04	0,20	-0,21	-0,21	8,60	8,76
Norway (NO	-6,63	-6,50	-7,35	-7,35	0,56	0,69
Switzerland (CH)	24,46	24,62	20,16	20,16	39,79	39,94
EU18	**-0,11**	**-0,02**	**2,03**	**2,88**	**4,36**	**4,44**
Turkey (TR)	-2,95	-1,38	-2,65	-2,65	-2,65	-1,32
EU19	**-0,17**	**-0,05**	**1,94**	**2,77**	**4,22**	**4,32**

1) Switzerland: Language dummy variable with German.

Table 3b: Change in Export Quotas due to EU Enlargement [1]
(Exports of Western European Countries to Europe19; average 1990 to 1994)

Exporter	Potential exports are estimated with:					
	Gravity equation (9a) Dummy variables:		Gravity equation (9b) Dummy variables:			
	EEA18	EEA19	EU12	EU15	EU18	EU19
	(Potential exports - actual exports) in % of GDP					
Belgium-Lux. (BE-LU)	-4,90	-4,77	-2,57	-2,07	-0,94	-0,85
Denmark (DK)	1,24	1,39	2,00	2,85	3,46	3,58
Germany (DE)	-1,31	-1,23	-2,51	-2,00	-1,24	-1,18
Greece (GR)	1,44	1,70	0,85	1,09	1,27	1,43
Spain (ES)	-0,83	-0,76	-1,64	-1,47	-1,29	-1,25
France (FR)	4,19	4,28	2,92	3,19	3,83	3,89
Ireland (IE)	-22,22	-22,11	-21,39	-21,00	-20,64	-20,56
Italy (IT)	2,12	2,22	1,23	1,54	2,50	2,57
Netherlands (NL)	-11,13	-11,02	-9,72	-9,30	-8,86	-8,79
Portugal (PT)	-8,24	-8,16	-8,90	-8,72	-8,56	-8,51
United Kindom (GB)	-0,40	-0,33	0,21	0,45	0,71	0,75
EU12	**-0,25**	**-0,16**	**-0,80**	**-0,44**	**0,18**	**0,25**
Austria (AT)	7,69	7,87	-0,80	7,30	8,18	8,32
Finland (FI)	-0,93	-0,79	-4,97	0,17	0,54	0,65
Sweden (SE)	-3,95	-3,82	-7,87	-2,97	-2,51	-2,41
EU15	**-0,18**	**-0,08**	**-1,08**	**-0,31**	**0,31**	**0,37**
Iceland (IS)	1,36	1,53	-2,63	-2,63	5,16	5,30
Norway (NO	-5,50	-5,36	-9,64	-9,64	-2,70	-2,59
Switzerland (CH)	39,18	39,34	23,17	23,17	45,01	45,14
EU18	**0,99**	**1,09**	**-0,45**	**0,28**	**1,68**	**1,75**
Turkey (TR)	-2,79	-1,10	-2,97	-2,97	-2,97	-1,77
EU19	**0,91**	**1,04**	**-0,50**	**0,21**	**1,59**	**1,68**

1) Switzerland: Language dummy variable with German, French and Italian.

Table 4a: Actual and Potential Bilateral Trade Flows of OECD Countries
Potential exports/actual exports; Gravity equation (9a); average 1990 to 1994

	BE-LU	DK	DE	GR	ES	FR	IE	IT	NL	PT	GB	EU12	AT	FI	SE	EU15
BE-LU		0,80	0,84	0,50	0,60	1,22	0,77	0,82	0,64	0,39	0,69	0,87	0,71	0,78	0,57	0,86
DK	1,44		1,05	0,89	1,65	1,76	1,15	1,85	0,93	1,04	0,88	1,19	2,11	0,58	0,36	1,04
DE	0,72	0,88		0,52	0,68	1,01	0,93	0,97	0,59	0,46	0,90	0,83	0,79	0,72	0,57	0,82
GR	1,33	2,04	0,71		2,55	1,55	2,82	0,79	1,11	2,88	1,29	1,03	1,87	1,93	1,83	1,07
ES	0,75	1,66	0,85	0,98		0,73	1,66	0,91	0,66	0,32	1,05	0,79	1,86	2,19	1,49	0,82
FR	1,34	1,45	1,34	0,84	0,77		1,36	1,26	0,85	0,49	1,38	1,20	1,65	1,91	1,32	1,22
IE	0,24	0,55	0,42	0,47	0,67	0,49		0,73	0,25	0,71	0,53	0,48	0,91	0,59	0,36	0,48
IT	0,89	1,59	0,91	0,46	0,80	1,06	1,49		1,00	0,47	1,15	0,96	1,17	1,62	1,46	0,98
NL	0,56	0,60	0,55	0,33	0,72	0,72	0,65	0,77		0,44	0,80	0,63	0,79	0,77	0,60	0,63
PT	0,40	0,31	0,40	1,04	0,50	0,44	0,86	1,42	0,31		0,45	0,48	0,79	0,37	0,28	0,48
GB	0,59	0,85	1,05	0,75	0,84	1,32	0,45	1,28	0,60	0,60		0,93	1,66	0,69	0,54	0,92
EU12	0,82	0,96	0,92	0,58	0,75	1,03	0,66	1,05	0,66	0,45	0,96	0,89	0,95	0,92	0,68	0,89
AT	1,26	1,75	1,28	1,67	1,44	2,05	2,33	1,64	1,00	1,30	1,96	1,42		1,55	1,21	1,42
FI	0,83	0,48	0,83	1,18	1,06	1,23	0,82	1,91	0,51	0,80	0,59	0,86	1,39		1,02	0,90
SE	0,44	0,35	0,79	1,18	1,10	1,24	0,70	1,39	0,47	0,83	0,60	0,75	1,10	1,14		0,79
EU15	0,82	0,85	0,94	0,62	0,77	1,05	0,68	1,09	0,66	0,47	0,95	0,90	0,96	0,98	0,72	0,90
IS	1,86	0,32	1,24	1,00	0,96	1,26	10,21	3,21	1,93	0,36	0,46	0,96	17,66	1,68	1,81	1,01
NO	0,86	0,45	1,06	2,27	2,40	1,01	0,62	2,48	0,38	0,65	0,30	0,71	4,02	0,63	0,45	0,69
CH	1,60	1,34	3,16	1,37	1,83	2,04	1,89	3,21	1,41	0,96	1,34	2,48	1,84	1,29	1,11	2,40
EU18	0,83	0,84	1,08	0,65	0,81	1,09	0,69	1,21	0,66	0,49	0,92	0,96	1,02	0,97	0,71	0,95
TR	0,39	0,89	0,21	1,10	0,91	0,64	1,12	0,56	0,30	0,96	0,49	0,40	0,61	2,81	1,46	0,42
EU19	0,83	0,84	1,07	0,65	0,81	1,09	0,69	1,20	0,66	0,49	0,92	0,96	1,02	0,97	0,71	0,95
AU	0,32	1,44	0,99	2,29	1,40	0,88	6,52	0,63	0,25	2,21	0,65	0,72	6,27	0,82	1,31	0,75
CA	0,42	2,33	1,16	2,47	2,29	1,47	2,52	1,51	0,42	1,49	1,22	1,16	2,04	2,28	1,91	1,20
JP	0,41	1,25	0,53	0,89	1,35	1,25	0,42	1,80	0,31	1,09	0,54	0,70	0,85	1,15	1,04	0,72
NZ	0,18	0,78	0,51	0,28	1,00	0,81	1,60	0,59	0,42	0,51	0,27	0,42	2,38	2,86	0,89	0,44
US	0,29	1,36	0,87	1,40	1,21	0,91	0,72	1,39	0,29	1,52	1,03	0,85	1,92	1,61	0,96	0,87

	IS	NO	CH	EU18	TR	EU19	AU	CA	JP	NZ	US
BE-LU	1,24	1,09	1,73	0,88	0,69	0,88	0,40	0,93	1,14	0,44	0,59
DK	0,16	0,34	1,27	0,99	2,62	0,99	0,66	1,82	0,94	0,65	1,32
DE	1,02	1,01	1,53	0,88	0,50	0,87	0,31	0,82	0,88	0,44	0,58
GR	9,27	3,10	2,22	1,11	2,41	1,14	0,94	2,60	5,70	2,78	2,00
ES	2,15	1,71	1,71	0,84	1,36	0,85	1,30	1,67	3,66	1,68	1,50
FR	2,96	2,26	2,40	1,29	0,97	1,29	0,58	0,85	1,51	0,81	0,84
IE	1,13	0,54	0,48	0,48	1,76	0,48	0,48	0,80	0,53	0,59	0,76
IT	2,30	2,18	3,61	1,15	0,69	1,15	0,44	0,89	1,42	0,48	0,75
NL	0,36	0,84	0,82	0,64	0,74	0,64	0,38	1,09	1,85	0,40	0,79
PT	0,74	0,50	0,69	0,48	2,51	0,49	1,01	0,92	3,29	0,86	1,26
GB	0,60	0,69	1,04	0,91	0,76	0,91	0,36	0,95	1,18	0,31	0,92
EU12	0,86	0,99	1,91	0,94	0,73	0,94	0,42	0,94	1,23	0,46	0,79
AT	2,12	1,86	1,33	1,41	1,76	1,42	0,72	1,23	1,98	0,95	1,85
FI	0,68	0,64	1,01	0,89	2,07	0,90	0,28	1,19	2,37	0,49	1,01
SE	0,31	0,30	0,79	0,73	1,53	0,74	0,23	0,67	1,43	0,25	0,70
EU15	0,80	0,81	1,85	0,95	0,78	0,95	0,41	0,93	1,27	0,45	0,80
IS		0,77	0,74	0,99	22,89	1,00	9,68	3,59	0,85	3,09	1,17
NO	0,16		2,82	0,70	2,77	0,71	1,12	0,32	1,92	0,82	1,06
CH	1,96	1,95		2,40	1,00	2,38	0,34	1,04	0,78	0,38	0,68
EU18	0,73	0,83	1,85	0,99	0,81	0,99	0,41	0,90	1,25	0,46	0,80
TR	2,75	1,43	0,54	0,43		0,43	1,44	1,76	2,26	1,50	0,74
EU19	0,73	0,83	1,85	0,99	0,81	0,99	0,41	0,90	1,25	0,46	0,80
AU	16,56	1,44	0,29	0,72	0,71	0,72		1,19	0,20	0,13	1,78
CA	3,08	0,47	0,49	1,12	2,66	1,14	1,33		1,11	1,57	0,84
JP	1,78	0,81	0,63	0,72	1,53	0,73	0,35	1,26		0,37	0,51
NZ	4,97	3,88	0,72	0,46	0,47	0,46	0,13	0,86	0,23		0,87
US	1,08	1,28	0,56	0,86	0,80	0,86	0,78	1,05	0,95	0,97	

Notes: AU = Australia, CA = Canada, JP = Japan, NZ = New Zealand, US = USA.

Table 4b: Actual and Potential Bilateral Trade Flows of OECD Countries
Potential exports/actual exports; Gravity equation (9b); average 1990 to 1994

	BE-LU	DK	DE	GR	ES	FR	IE	IT	NL	PT	GB	EU12	AT	FI	SE	EU15
BE-LU		1,29	1,10	0,65	0,79	1,56	1,18	1,20	0,89	0,50	1,04	1,16	0,72	0,74	0,55	1,14
DK	2,33		1,26	1,18	2,15	2,54	1,76	2,62	1,50	1,36	1,27	1,61	2,23	0,62	0,31	1,37
DE	0,94	1,05		0,63	0,82	1,11	1,28	1,32	0,71	0,55	1,20	1,03	0,62	0,64	0,52	0,97
GR	1,69	2,68	0,85		2,91	1,83	3,48	0,96	1,37	3,28	1,47	1,23	1,66	1,61	1,52	1,25
ES	0,99	2,14	1,02	1,13		0,73	2,17	1,12	0,83	0,34	1,27	0,91	1,56	1,76	1,20	0,93
FR	1,71	2,09	1,48	1,00	0,77		1,95	1,35	1,27	0,60	1,97	1,45	1,52	1,65	1,16	1,45
IE	0,37	0,84	0,58	0,59	0,88	0,70		0,97	0,38	0,93	0,64	0,63	0,85	0,55	0,34	0,62
IT	1,30	2,24	1,24	0,57	0,99	1,13	1,98		1,38	0,57	1,45	1,20	0,89	1,39	1,26	1,19
NL	0,78	0,96	0,66	0,40	0,91	1,07	0,99	1,06		0,56	1,21	0,85	0,77	0,72	0,57	0,84
PT	0,52	0,40	0,47	1,19	0,54	0,54	1,13	1,69	0,38		0,54	0,57	0,65	0,30	0,23	0,55
GB	0,88	1,21	1,39	0,86	1,02	1,87	0,55	1,62	0,90	0,72		1,26	1,47	0,59	0,47	1,22
EU12	1,10	1,30	1,13	0,70	0,87	1,25	0,88	1,33	0,90	0,54	1,31	1,13	0,78	0,81	0,60	1,10
AT	1,27	1,85	1,00	1,50	1,21	1,88	2,19	1,25	0,97	1,09	1,73	1,17		1,51	1,19	1,17
FI	0,78	0,51	0,73	1,00	0,86	1,06	0,76	1,64	0,48	0,65	0,50	0,75	1,36		0,95	0,81
SE	0,42	0,31	0,71	0,99	0,89	1,09	0,66	1,21	0,45	0,68	0,53	0,66	1,08	1,06		0,71
EU15	1,09	1,11	1,10	0,72	0,88	1,25	0,88	1,33	0,88	0,55	1,26	1,11	0,79	0,88	0,65	1,08
IS	1,93	0,35	1,18	0,90	0,89	1,22	11,26	2,99	1,99	0,34	0,45	0,92	18,02	1,78	1,93	0,98
NO	0,88	0,54	1,01	1,96	2,04	0,94	0,63	2,25	0,40	0,56	0,28	0,67	4,08	0,54	0,40	0,65
CH	1,84	1,45	2,75	1,25	1,68	1,69	1,92	2,86	1,51	0,87	1,30	2,22	1,64	1,28	1,11	2,15
EU18	1,10	1,08	1,21	0,74	0,90	1,26	0,89	1,41	0,88	0,56	1,20	1,15	0,85	0,87	0,64	1,11
TR	0,47	1,12	0,24	1,11	0,96	0,71	1,30	0,63	0,34	1,02	0,53	0,44	0,78	3,45	1,78	0,48
EU19	1,09	1,08	1,19	0,75	0,90	1,26	0,89	1,41	0,87	0,56	1,19	1,14	0,85	0,88	0,64	1,11
AU	0,37	1,70	1,04	2,40	1,45	0,94	7,67	0,66	0,28	2,36	0,69	0,76	7,15	0,96	1,51	0,80
CA	0,52	3,04	1,33	2,82	2,60	1,71	3,29	1,73	0,52	1,73	1,44	1,36	2,56	2,94	2,44	1,42
JP	0,48	1,54	0,58	0,96	1,44	1,37	0,50	1,94	0,35	1,19	0,58	0,77	1,01	1,39	1,26	0,80
NZ	0,21	0,95	0,55	0,31	1,07	0,88	1,93	0,63	0,48	0,56	0,29	0,46	2,81	3,46	1,06	0,49
US	0,34	1,64	0,93	1,49	1,29	0,98	0,87	1,47	0,33	1,66	1,12	0,92	2,22	1,91	1,13	0,95

	IS	NO	CH	EU18	TR	EU19	AU	CA	JP	NZ	US
BE-LU	1,29	1,11	2,02	1,17	0,84	1,17	0,45	1,16	1,34	0,51	0,68
DK	0,17	0,40	1,37	1,28	3,36	1,29	0,78	2,39	1,15	0,80	1,59
DE	0,98	0,96	1,32	1,00	0,57	0,99	0,33	0,95	0,95	0,48	0,62
GR	8,29	2,65	1,99	1,27	2,47	1,30	0,98	2,94	6,08	3,05	2,10
ES	1,97	1,45	1,55	0,95	1,46	0,95	1,34	1,89	3,87	1,79	1,58
FR	2,86	2,10	2,02	1,49	1,10	1,48	0,61	0,99	1,65	0,88	0,91
IE	1,24	0,55	0,48	0,62	2,08	0,62	0,57	1,05	0,63	0,71	0,92
IT	2,14	1,96	3,27	1,33	0,80	1,32	0,46	1,02	1,53	0,52	0,80
NL	0,37	0,87	0,87	0,85	0,87	0,85	0,43	1,34	2,12	0,46	0,90
PT	0,69	0,42	0,61	0,55	2,69	0,56	1,07	1,06	3,55	0,94	1,36
GB	0,58	0,64	1,01	1,20	0,83	1,19	0,38	1,12	1,27	0,34	1,01
EU12	0,84	0,94	1,71	1,13	0,83	1,13	0,45	1,10	1,35	0,51	0,86
AT	2,17	1,89	1,17	1,18	2,32	1,18	0,82	1,54	2,33	1,13	2,14
FI	0,72	0,55	0,99	0,80	2,59	0,81	0,33	1,54	2,86	0,59	1,20
SE	0,33	0,27	0,79	0,66	1,90	0,67	0,26	0,86	1,72	0,30	0,83
EU15	0,79	0,77	1,66	1,11	0,90	1,11	0,44	1,11	1,41	0,50	0,88
IS		0,87	0,80	0,97	30,20	0,99	13,06	5,49	1,19	4,30	1,64
NO	0,18		2,95	0,67	3,52	0,68	1,35	0,43	2,39	1,02	1,30
CH	2,10	2,04		2,15	1,31	2,14	0,40	1,36	0,96	0,47	0,83
EU18	0,72	0,79	1,67	1,14	0,94	1,13	0,44	1,07	1,39	0,51	0,89
TR	3,55	1,78	0,69	0,49		0,49	1,28	1,68	2,04	1,39	0,65
EU19	0,72	0,79	1,66	1,13	0,94	1,13	0,45	1,08	1,39	0,51	0,89
AU	22,25	1,73	0,34	0,78	0,64	0,77		1,39	0,23	0,19	1,95
CA	4,69	0,63	0,63	1,33	2,61	1,34	1,57		1,43	1,89	0,95
JP	2,51	1,02	0,78	0,80	1,42	0,81	0,41	1,64		0,44	0,59
NZ	6,86	4,80	0,88	0,51	0,44	0,51	0,19	1,04	0,27		0,97
US	1,52	1,57	0,68	0,95	0,72	0,94	0,86	1,19	1,10	1,09	

Table 5: Actual and Hypothetical Trade Balances in Trade with Western Europe
(Trade Balance in Trade with Europe19) [1]; average 1990 to 1994

Exporter	Actual trade balance in % of GDP	Potential exports are estimated with: Gravity equation (9a) Dummy variables: EEA18	EEA19	Gravity equation (9b) Dummy variables: EU12	EU15	EU18	EU19
		Trade balance in % of GDP					
Belgium-Lux. (BE-LU)	2,61	4,50	4,58	5,99	5,96	6,48	6,56
Denmark (DK)	0,77	3,60	3,70	4,88	4,95	4,89	4,99
Germany (DE)	2,29	-0,56	-0,51	-0,32	-0,39	-0,74	-0,70
Greece (GR)	-9,26	-2,86	-2,75	-3,32	-3,49	-3,67	-3,58
Spain (ES)	-2,85	-1,93	-1,89	-2,14	-2,23	-2,37	-2,34
France (FR)	-1,41	0,92	0,96	0,91	0,87	1,12	1,16
Ireland (IE)	11,96	-0,82	-0,75	-1,14	-1,25	-1,44	-1,38
Italy (IT)	0,77	0,31	0,36	0,18	0,10	0,47	0,51
Netherlands (NL)	2,05	0,54	0,61	0,85	0,79	0,64	0,69
Portugal (PT)	-7,28	-3,53	-3,49	-4,10	-4,24	-4,43	-4,40
United Kindom (GB)	-1,46	-1,38	-1,34	-1,78	-1,86	-2,01	-1,97
EU12	**0,19**	**-0,11**	**-0,05**	**-0,07**	**-0,14**	**-0,16**	**-0,11**
Austria (AT)	-4,64	2,35	2,46	1,94	3,09	2,85	2,96
Finland (FI)	2,29	1,10	1,19	0,97	1,47	1,39	1,47
Sweden (SE)	1,91	1,87	1,95	1,70	2,57	2,50	2,58
EU15	**0,10**	**0,02**	**0,08**	**0,04**	**0,04**	**0,01**	**0,06**
Iceland (IS)	0,48	5,01	5,12	4,92	4,92	7,37	7,49
Norway (NO	7,52	3,49	3,59	3,34	3,34	4,98	5,08
Switzerland (CH)	-4,98	0,28	0,39	0,16	0,16	0,13	0,24
EU18	**0,06**	**0,09**	**0,14**	**0,10**	**0,10**	**0,10**	**0,15**
Türkei	-4,81	-5,40	-9,18	-6,33	-6,33	-6,33	-9,64
EU19	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**

1) Trade balance is calculated as the sum of exports of country *i* to country *j* minus the exports of country *j* to country *i* (summation over 19 Western European countries).

Table 6a: The Development of West-East Exports between 1990 and 1995

Exporter	CEEC6		CEEC10[1)]	Former USSR		East	
	1990	1995	1995	1990	1995	1990	1995
	Shares in total exports as %						
BE-LU	0,49	1,23	1,40	0,38	0,75	1,11	2,17
DK	1,12	2,14	2,71	0,99	2,14	2,41	4,54
DE	2,04	5,14	5,79	1,60	2,18	4,92	8,14
GR	2,47	7,51	7,98	1,58	3,96	6,51	14,92
ES	0,38	1,15	1,41	0,68	0,54	1,23	1,97
FR	0,64	1,40	1,70	0,71	0,80	1,88	2,55
IE	0,33	0,84	0,93	0,65	0,93	1,06	1,83
IT	1,27	3,23	4,15	1,56	1,59	4,62	6,70
NL	0,69	1,54	1,81	0,39	1,25	1,42	3,09
PT	0,15	0,34	0,43	0,43	0,40	0,63	0,76
GB	0,59	1,43	1,58	0,59	0,79	1,43	2,47
EU12	1,12	2,86	3,33	1,01	1,43	2,93	4,98
AT	5,56	9,28	11,06	2,16	1,93	10,41	14,06
FI	0,96	2,42	5,66	12,52	8,30	13,71	10,85
SE	1,12	2,21	3,01	0,74	1,67	2,31	4,18
EU15	1,24	3,02	3,61	1,24	1,60	3,31	5,36
IS	0,40	0,21	0,33	2,53	0,68	3,03	0,91
NO	0,61	1,16	1,40	0,51	0,75	1,25	2,10
CH	1,40	1,92	2,17	1,15	0,63	3,19	2,93
TR	2,25	4,67	5,00	4,10	9,70	7,52	15,29
AU	0,49	0,27	0,34	0,84	0,29	1,50	0,61
CA	0,08	0,13	0,14	0,76	0,11	0,88	0,25
JP	0,22	0,17	0,18	0,89	0,30	1,20	0,48
NZ	0,21	0,06	0,06	1,92	0,86	2,15	0,96
US	0,29	0,34	0,41	0,82	0,68	1,26	1,08

Notes: CEEC6 = Bulgaria (BG), Czech Republic (CZ), Hungary (HU), Poland (PL), Romania (RO), Slovak Republic (SK).
CEEC10 = Bulgaria (BG), Czech Republic (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Romania (RO), Slovenia (SI), Slovak Republic (SK).
Former USSR = Armenia (AM), Azerbaijan (AZ), Belarus (BY), Georgia (GE), Kyrgyz Repbulic (KG), Kazahstan (KZ), Moldova (MD), Russia (RU), Tajikistan (TJ), Turkmenistan (TM), Ukraine (UA), Uzbekistan (UZ) (inclusive the 3 Baltic states: EE, LT, LV).
East= all countries.

1) For 1990 not all necessary data are available.

Table 6b: The Development of West-East Imports between 1990 and 1995

Importer	CEEC6		CEEC10[1)]	Former USSR		East	
	1990	1995	1995	1990	1995	1990	1995
	Shares in total imports as %						
BE-LU	0,51	0,93	1,10	1,18	1,37	1,86	2,41
DK	1,44	1,98	2,55	0,69	1,57	2,33	3,69
DE	2,30	5,43	6,19	1,66	2,55	5,29	8,81
GR	2,12	3,37	3,50	1,81	3,20	5,39	6,95
ES	0,52	1,06	1,18	1,51	1,53	2,19	2,67
FR	0,78	1,05	1,38	1,44	1,47	2,61	2,87
IE	0,64	0,45	0,52	0,34	0,18	1,10	0,71
IT	1,35	2,82	3,45	2,27	3,36	5,30	7,41
NL	0,83	1,41	1,88	1,22	1,31	2,29	2,87
PT	0,17	0,38	0,50	0,19	1,01	0,39	1,44
GB	0,55	1,02	1,36	0,73	0,92	1,43	2,03
EU12	1,17	2,60	3,09	1,40	1,91	3,27	5,02
AT	3,82	5,56	6,36	1,84	0,83	6,85	7,46
FI	2,00	1,94	3,53	9,49	8,98	11,66	11,02
SE	1,31	1,66	3,03	1,38	2,05	3,01	3,85
EU15	1,28	2,67	3,22	1,55	2,00	3,52	5,17
IS	1,58	1,87	2,53	4,95	2,98	6,66	4,90
NO	0,82	1,05	1,59	1,42	2,39	2,55	3,54
CH	0,56	0,88	0,99	0,40	0,59	1,17	1,62
TR	3,13	2,95	3,18	5,59	9,42	9,90	12,63
AU	0,24	0,19	0,23	0,08	0,06	0,42	0,29
CA	0,21	0,17	0,21	0,16	0,26	0,44	0,47
JP	0,25	0,13	0,16	1,43	1,52	1,71	1,66
NZ	0,10	0,11	0,13	0,06	0,03	0,18	0,16
US	0,24	0,29	0,36	0,23	0,68	0,62	1,04

1) For 1990 not all necessary data are available.

Table 6c: The Development of the Trade Balance in West-East Trade between 1990 and 1995

Reporter	CEEC6		CEEC10[1)]	Former USSR		East	
	1990	1995	1995	1990	1995	1990	1995
	Mill. $						
BE-LU	-24,8	517,5	538,7	-965,2	-693,8	-921,7	-56,1
DK	-62,3	189,8	222,6	129,6	369,1	102,6	619,5
DE	246,4	1.754,2	1.606,3	700,8	-452,8	1.505,9	1.759,1
GR	-220,0	-51,1	-33,1	-230,7	-396,2	-540,2	-167,8
ES	-245,6	-177,6	-75,5	-944,2	-1.248,2	-1.241,8	-1.257,8
FR	-474,9	1.108,3	1.042,0	-1.852,6	-1.747,2	-2.151,5	-609,6
IE	-53,1	221,2	239,4	83,2	349,1	25,3	570,9
IT	-300,2	1.726,6	2.564,0	-1.447,6	-3.182,2	-1.753,9	377,6
NL	-132,8	503,5	248,3	-1.017,7	151,6	-1.015,6	948,4
PT	-18,3	-47,7	-68,8	22,1	-245,5	3,9	-305,0
GB	-143,5	749,2	231,4	-550,4	-518,0	-557,2	603,2
EU12	-1.429,2	5.976,3	5.976,6	-6.072,8	-6.920,3	-6.544,3	2.538,6
AT	414,8	1.653,0	2.143,0	-15,6	555,8	935,7	3.134,9
FI	-286,7	407,1	1.246,3	776,8	701,4	503,9	1.132,3
SE	-69,6	689,5	466,2	-332,7	29,0	-317,5	859,2
EU15	-1.370,7	8.725,9	9.832,2	-5.644,3	-5.634,1	-5.422,1	7.665,0
IS	-19,8	-29,0	-38,4	-42,0	-40,0	-62,4	-69,4
NO	-14,9	141,4	65,2	-209,9	-470,7	-258,8	-281,6
CH	502,6	857,4	977,2	454,8	41,3	1.222,6	1.090,5
TR	-406,5	-44,2	-56,6	-716,3	-1.267,4	-1.233,4	-1.209,3
AU	96,8	29,2	39,4	293,8	116,5	412,4	139,0
CA	-152,8	-38,7	-78,5	783,4	-223,8	599,6	-280,0
JP	43,5	292,8	259,9	-788,1	-3.769,7	-562,9	-3.459,2
NZ	10,3	-7,7	-9,7	168,9	110,4	178,1	104,8
US	-135,0	-409,9	-523,0	1.906,1	-1.519,6	1.503,5	-2.130,6

1) For 1990 not all necessary data are available.

Table 7a: The Development of East-West Exports between 1990 and 1995

Exporter	EU15		RGW	
	1990	1995	1990	1995
	Shares in total exports as %			
BG	37,7	38,6	22,8	20,9
CS	38,9	54,3	38,1	33,2
CZ		61,0		25,7
SK		37,4		52,1
HU	45,4	62,8	28,1	19,0
PL	54,8	70,1	22,0	17,3
RO	33,3	54,1	33,1	9,8
CEEC6	44,5	59,2	29,4	23,1
EE		54,1		38,8
LT		36,4		56,9
LV		44,0		50,5
SI		67,0		9,8
CEEC10		58,9		23,6
HR		57,7		8,1
MK		34,0		0,0
AM		22,2		47,6
AZ		17,2		41,6
BY		12,5		79,3
GE		11,9		73,3
KG		11,9		82,3
KZ		10,6		76,2
MD		11,6		83,3
RU		33,6		31,4
TJ		46,3		40,6
TM		7,6		50,9
UA		11,4		59,7
UZ		23,8		61,3
Former USSR	50,8	28,6	17,6	41,3

Notes: CS = Former CSFR.
RGW = Bulgaria (BG), Czech Republic (CZ), Hungary (HU), Poland (PL), Romania (RO), Slovak Republic (SK), former USSR.

Table 7b: The Development of East-West Imports between 1990 and 1995

Importer	EU15		RGW	
	1990	1995	1990	1995
	Shares in total imports as %			
BG	51,7	38,4	13,1	38,3
CS	43,3	53,8	35,4	32,0
CZ		61,1		24,3
SK		34,8		52,0
HU	48,9	61,5	27,8	21,8
PL	51,4	64,7	25,2	15,4
RO	21,5	49,9	35,5	21,3
CEEC6	42,2	57,0	30,0	24,5
EE		66,0		24,3
LT		37,2		54,9
LV		49,9		42,6
SI		68,8		10,2
CEEC10		57,5		24,5
HR		62,1		9,1
MK		40,3		0,0
AM		15,0		50,1
AZ		12,7		39,1
BY		15,7		77,6
GE		23,0		47,8
KG		1,6		68,8
KZ		13,3		79,2
MD		13,7		81,6
RU		38,8		38,8
TJ		25,9		60,5
TM		10,9		56,2
UA		15,5		57,4
UZ		21,1		54,9
Former USSR	44,3	29,7	15,8	49,2

Table 7c: The Development of the Trade Balance in East-West Trade between 1990 and 1995

Importer	EU15		RGW	
	1990	1995	1990	1995
	Mill. $			
BG	-1.008,6	-85,4	17,9	-1.003,2
CS	-1.060,9	-2.382,7	-118,1	-1.121,8
CZ		-2.237,3		-573,6
SK		-145,4		-548,2
HU	133,4	-1.437,3	297,0	-929,5
PL	2.851,9	-2.742,7	738,4	-523,3
RO	-9,1	-843,4	-1.286,7	-1.411,5
CEEC6	1.915,3	-9.788,8	-369,4	-5.107,9
EE		-685,2		94,5
LT		-372,2		-463,0
LV		-332,3		-115,1
SI		-957,0		-153,2
CEEC10		-12.135,4		-5.744,7
HR		-1.991,4		-312,9
MK		-279,1		-0,1
AM		-25,3		-179,0
AZ		9,2		-34,3
BY		-283,1		-589,5
GE		-114,5		-124,8
KG		51,0		128,6
KZ		-193,6		-621,4
MD		-29,0		-64,9
RU		8.050,0		6.372,0
TJ		136,6		-186,4
TM		-6,0		190,6
UA		-1.419,8		-2.640,4
UZ		-2,4		-23,6
Former USSR	-2.642,1	5.683,6	-1.181,8	2.507,0

Table 8: Trade Potential versus Actual Trade from West to East
Potential exports/actual exports; Gravity equation (9a); average 1993 to 1994

	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK	CEEC10	HR	MK
BE-LU	0,84	0,60	0,92	0,50	1,19	0,94	0,58	1,49	0,76	1,27	0,67	1,14	0,57
DK	1,27	1,35	0,56	1,50	0,68	0,84	0,70	2,61	1,87	2,14	1,01	0,94	1,18
DE	0,46	0,35	0,84	0,30	0,50	0,63	0,44	0,54	0,31	0,47	0,40	0,38	0,25
GR	0,11	1,08	5,70	1,36	3,46	7,85	1,39	0,60	2,09	1,41	0,54	2,44	0,11
ES	1,62	1,19	4,80	0,98	3,58	6,97	1,14	2,68	1,06	2,39	1,34	2,90	17,46
FR	1,28	1,12	4,04	1,25	1,88	2,88	1,29	0,95	0,48	2,38	1,15	2,07	0,95
IE	2,21	0,65	1,56	0,87	4,38	3,58	1,09	4,37	1,60	6,61	1,19	3,00	7,72
IT	0,68	0,88	2,23	0,61	2,24	3,06	0,67	0,53	0,38	0,89	0,65	0,34	0,22
NL	0,59	0,63	0,69	0,53	0,67	0,93	0,46	0,89	0,57	0,99	0,58	0,40	0,27
PT	1,58	4,02	4,91	1,89	1,58	9,42	11,38	7,28	2,39	4,75	3,74	7,94	-
GB	1,63	4,23	6,15	1,08	2,07	1,24	1,16	0,79	2,13	0,64	1,44	2,54	15,05
EU12	0,66	0,55	1,32	0,51	0,94	1,15	0,61	0,74	0,75	0,80	0,64	0,52	0,64
AT	0,50	0,36	3,14	0,28	4,81	3,56	0,82	1,11	0,25	1,05	0,47	0,38	0,26
FI	0,72	0,62	0,09	0,44	0,44	0,33	0,53	3,23	1,06	0,76	0,38	1,80	1,87
SE	1,73	0,99	0,36	0,68	1,05	0,65	0,91	3,06	1,04	2,13	0,91	0,68	1,23
EU15	0,67	0,53	0,47	0,47	0,94	1,01	0,63	0,78	0,70	0,86	0,62	0,52	0,63

	AM	AZ	BY	GE	KG	KZ	MD	RU	TJ	TM	UA	UZ	Former USSR	East
BE-LU	1,48	3,74	2,96	2,54	8,43	2,66	6,66	1,15	4,33	4,16	4,79	6,58	1,62	1,00
DK	1,85	5,01	8,82	2,42	4,79	5,00	14,67	1,96	1,33	22,01	7,50	5,05	2,33	1,54
DE	3,58	2,61	1,20	4,03	3,35	0,57	2,92	0,64	4,04	1,15	1,81	1,09	0,83	0,53
GR	2,30	7,66	15,48	1,45	101,13	3,91	4,49	1,10	17,93	14,99	1,94	13,40	1,59	0,81
ES	34,64	31,62	16,56	12,24	18,04	16,48	32,58	3,00	1.187,27	5,62	15,41	99,73	4,72	2,34
FR	2,21	5,25	7,96	1,85	15,20	2,02	8,29	1,97	7,92	10,90	6,60	5,57	2,72	1,70
IE	1,18	14,90	9,76	8,98	29,08	10,50	16,36	1,05	1,70	18,86	8,20	1,94	1,67	1,44
IT	3,21	3,62	5,86	1,48	3,72	1,90	5,92	1,22	3,91	0,82	4,17	5,32	1,77	0,88
NL	2,03	2,77	3,35	1,94	13,19	1,14	10,14	0,83	3,28	2,07	4,40	2,51	1,17	0,79
PT	-	16,12	12,36	4,33	-	25,56	8,53	2,84	10,55	15,18	4,16	28,08	3,73	3,84
GB	0,94	3,04	6,48	2,98	3,24	2,54	2,95	19,67	1,58	1,24	2,68	6,72	2,79	1,78
EU12	1,48	3,68	2,67	2,48	4,20	1,20	4,53	1,03	2,21	1,66	3,22	3,58	1,43	0,87
AT	64,04	3,30	5,49	8,26	46,08	1,33	26,12	1,26	2,74	1,71	6,27	5,23	1,97	0,65
FI	13,67	5,55	4,96	12,05	41,97	1,90	12,73	0,62	18,01	2,26	4,75	8,08	0,61	0,62
SE	2,91	14,24	21,12	21,24	6,86	4,11	48,61	3,06	7,19	17,36	17,01	29,54	2,89	1,73
EU15	1,58	3,84	2,99	2,71	4,44	1,27	5,03	1,05	2,30	1,75	3,53	3,74	1,41	0,87

Notes: HR = Croatia, MK = Macedonia.

Table 9: Trade Potential versus Actual Trade from East to West

Potential exports/actual exports; Gravity equatopm (9a); average 1993 to 1994

	BE-LU	DK	DE	GR	ES	FR	IE	IT	NL	PT	GB	EU12	AT	FI	SE	EU15
BG	0,21	0,41	0,20	0,06	0,58	0,37	2,43	0,24	0,21	0,43	0,36	0,23	0,28	0,52	0,85	0,24
CZ	0,45	0,53	0,21	0,32	0,74	1,37	1,25	0,48	0,30	1,09	0,55	0,34	0,17	0,71	0,60	0,32
EE	0,80	0,22	0,62	5,24	13,47	6,93	4,59	3,11	0,28	0,79	1,05	0,87	3,30	0,11	0,17	0,43
HU	0,40	1,08	0,19	0,71	1,31	0,82	4,01	0,42	0,37	2,15	0,64	0,37	0,18	0,53	0,57	0,34
LT	0,35	0,23	0,31	2,62	0,41	0,93	2,02	1,23	0,11	1,29	0,26	0,36	2,19	0,54	0,27	0,37
LV	0,94	0,73	0,71	8,33	11,07	2,93	0,40	2,96	0,25	1,82	0,42	0,82	0,82	0,48	0,27	0,70
PL	0,27	0,19	0,16	0,66	1,03	0,62	0,35	0,51	0,15	1,35	0,46	0,27	0,37	0,27	0,34	0,27
RO	0,28	2,32	0,19	0,18	0,99	0,38	1,58	0,19	0,15	3,17	0,41	0,25	0,36	4,45	0,85	0,27
SI	0,85	0,95	0,17	1,04	1,53	0,33	0,71	0,43	0,58	1,12	0,74	0,33	0,29	1,45	0,64	0,33
SK	0,40	1,26	0,19	0,54	1,22	1,00	1,31	0,56	0,32	1,39	1,07	0,38	0,43	0,69	0,71	0,40
CEEC10	0,47	0,39	0,18	0,57	0,67	0,55	0,59	0,38	0,36	0,29	0,50	0,34	0,26	0,22	0,48	0,31
HR	0,90	0,25	0,21	3,16	9,08	0,94	10,44	0,21	0,35	-	1,19	0,33	0,33	9,98	1,17	0,34
MK	0,44	0,74	0,11	0,10	1,20	0,48	5,63	0,12	0,23	-	1,55	0,19	0,19	1,69	1,02	0,20
AM	0,03	-	2,49	-	-	6,73	0,57	-	4,46	-	18,56	3,65	-	-	-	4,66
AZ	3,98	-	3,36	0,12	-	6,54	1,06	1,19	65,63	4,74	0,26	2,67	0,31	0,33	6,07	2,82
BY	1,51	8,37	1,61	3,08	10,90	15,34	4,27	4,11	1,68	26,27	5,22	2,98	1,53	3,54	7,54	2,98
GE	5,91	0,71	3,43	0,42	5,67	0,68	-	0,98	0,77	4,22	19,32	1,40	5,78	-	9,28	1,53
KG	-	-	2,03	-	24,90	7,58	-	7,12	7,53	-	0,23	1,24	1,02	6,52	4,42	1,30
KZ	0,94	8,77	0,94	8,98	4,28	1,38	6,19	0,83	0,96	3,56	0,51	0,98	3,38	0,45	2,26	1,00
MD	17,95	75,81	1,97	1,11	168,38	209,95	0,41	3,20	6,71	33,05	7,40	3,67	7,55	62,76	11,13	3,95
RU	0,19	0,81	0,27	0,49	1,29	0,63	0,06	0,32	0,17	2,16	0,21	0,30	0,20	0,15	0,39	0,28
TJ	0,05	-	1,08	0,84	11,33	-	-	3,29	0,02	-	0,06	0,16	0,08	0,06	0,31	0,15
TM	0,62	-	0,59	1,05	0,46	0,35	1,46	0,19	17,61	0,42	19,34	0,47	2,02	0,13	1,26	0,46
UA	14,76	3,49	2,61	3,41	5,75	4,02	29,51	1,14	5,73	6,98	6,34	2,75	0,87	10,71	144,11	2,67
UZ	0,77	1,28	0,20	12,07	0,71	0,53	3,27	0,37	7,16	0,38	12,37	0,44	1,07	1,30	50,84	0,47
Former USSR	0,30	0,98	0,41	0,76	1,69	0,94	0,11	0,48	0,26	2,25	0,34	0,45	0,33	0,21	0,54	0,43
East	0,33	0,56	0,24	0,44	1,36	0,77	0,17	0,41	0,25	1,80	0,42	0,37	0,27	0,25	0,52	0,36

Table 10: Trade Potential versus Actual Trade from West to East
Potential exports/actual exports; Gravity equation (9b); average 1993 to 1994

	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK	CEEC10	HR	MK
BE-LU	1,09	0,92	1,35	0,73	1,65	1,34	0,77	1,83	1,27	1,88	0,95	1,71	0,76
DK	1,71	2,19	0,92	2,31	1,04	1,36	1,02	3,40	3,18	3,32	1,53	1,42	1,65
DE	0,56	0,41	1,15	0,42	0,65	0,84	0,44	0,62	0,49	0,66	0,47	0,54	0,31
GR	0,11	1,38	7,36	1,83	4,32	9,96	1,64	0,75	3,10	1,86	0,67	3,32	0,12
ES	1,83	1,47	5,94	1,21	4,20	8,40	1,26	2,88	1,50	2,95	1,58	3,68	20,56
FR	1,53	1,54	5,40	1,67	2,38	3,76	1,56	1,08	0,73	3,21	1,48	2,84	1,18
IE	2,73	0,90	2,23	1,19	5,84	4,95	1,37	5,17	2,47	9,08	1,57	4,17	9,90
IT	0,85	1,24	2,95	0,85	2,85	3,99	0,81	0,62	0,50	1,25	0,85	0,51	0,28
NL	0,74	0,93	1,00	0,75	0,91	1,31	0,60	1,06	0,91	1,41	0,79	0,57	0,35
PT	1,77	4,90	6,09	2,30	1,85	11,32	12,53	7,77	3,30	5,78	4,37	9,91	-
GB	1,80	5,47	6,24	1,38	2,65	1,62	1,49	0,93	2,23	0,76	1,62	2,59	18,14
EU12	0,78	0,71	1,76	0,70	1,22	1,53	0,71	0,86	0,93	1,12	0,80	0,74	0,79
AT	0,71	0,48	4,74	0,39	7,13	5,35	1,20	1,50	0,39	1,67	0,68	0,65	0,39
FI	0,94	0,90	0,18	0,64	0,68	0,55	0,74	4,07	1,67	1,09	0,57	2,56	2,50
SE	2,24	1,47	0,64	0,99	1,62	1,08	1,28	3,84	1,65	3,09	1,33	0,98	1,64
EU15	0,80	0,70	0,68	0,65	1,26	1,39	0,75	0,92	0,88	1,24	0,80	0,75	0,78

	AM	AZ	BY	GE	KG	KZ	MD	RU	TJ	TM	UA	UZ	Former USSR	East
BE-LU	1,72	4,21	3,99	2,92	9,45	2,95	8,67	1,34	4,62	4,88	5,92	7,05	1,95	1,30
DK	2,26	5,96	13,14	2,93	5,69	5,86	20,37	2,49	1,51	27,24	9,99	5,72	3,05	2,14
DE	3,87	2,73	1,52	4,31	3,49	0,59	3,57	0,70	4,01	1,25	2,10	1,09	0,93	0,61
GR	2,65	8,43	18,96	1,65	107,68	4,11	5,69	1,19	18,37	17,06	2,26	13,70	1,78	0,95
ES	35,57	31,45	18,96	12,37	17,97	16,24	36,60	3,01	1.129,74	5,87	16,34	94,90	4,88	2,56
FR	2,37	5,47	9,82	1,96	15,80	2,08	9,93	2,12	7,85	11,86	7,47	5,53	3,00	2,02
IE	1,34	16,43	12,70	10,05	32,34	11,56	20,44	1,19	1,80	21,81	9,74	2,06	1,95	1,77
IT	3,49	3,79	7,26	1,59	3,86	1,94	7,24	1,32	3,88	0,90	4,79	5,28	1,96	1,06
NL	2,30	3,04	4,42	2,17	14,47	1,24	12,84	0,94	3,43	2,37	5,30	2,63	1,38	0,99
PT	-	16,09	14,12	4,38	-	25,41	9,54	2,86	10,12	15,95	4,40	26,93	3,86	4,18
GB	1,08	3,18	6,30	3,93	3,26	2,62	3,65	22,83	2,30	1,20	2,84	7,41	3,22	2,02
EU12	1,66	3,88	3,33	2,79	4,34	1,24	5,57	1,12	2,78	1,81	3,73	3,77	1,62	1,04
AT	77,94	3,88	7,89	9,97	53,24	1,52	37,18	1,55	3,03	2,08	8,35	5,78	2,51	0,90
FI	16,70	6,60	7,59	14,60	50,11	2,24	17,36	0,64	20,39	2,79	6,33	9,20	0,73	0,78
SE	3,49	16,65	31,52	25,29	8,04	4,77	65,59	3,89	8,00	21,14	22,27	33,01	3,81	2,34
EU15	1,77	4,12	3,84	3,08	4,64	1,34	6,27	1,16	2,86	1,94	4,17	3,96	1,62	1,05

Table 11: Trade Potential versus Actual Trade from East to West

Potential exports/actual exports; Gravity equation (9b); average 1993 to 1994

	BE-LU	DK	DE	GR	ES	FR	IE	IT	NL	PT	GB	EU12	AT	FI	SE	EU15
BG	0,27	0,54	0,24	0,07	0,64	0,42	2,92	0,29	0,26	0,48	0,41	0,27	0,38	0,65	1,06	0,29
CZ	0,67	0,84	0,24	0,40	0,91	1,84	1,73	0,66	0,43	1,32	0,71	0,43	0,22	1,01	0,87	0,41
EE	1,14	0,36	0,82	6,69	16,41	9,07	6,46	4,04	0,39	0,96	1,35	1,15	4,89	0,22	0,30	0,62
HU	0,57	1,62	0,26	0,95	1,59	1,08	5,41	0,58	0,52	2,61	0,81	0,49	0,25	0,75	0,81	0,46
LT	0,48	0,34	0,40	3,22	0,47	1,15	2,64	1,53	0,15	1,48	0,31	0,46	3,16	0,82	0,41	0,48
LV	1,32	1,15	0,93	10,42	13,09	3,73	0,54	3,77	0,35	2,16	0,53	1,06	1,20	0,79	0,43	0,93
PL	0,36	0,28	0,16	0,76	1,12	0,74	0,43	0,61	0,19	1,46	0,53	0,30	0,53	0,37	0,47	0,31
RO	0,34	2,92	0,21	0,22	1,03	0,42	1,82	0,21	0,17	3,32	0,44	0,28	0,47	5,46	1,04	0,30
SI	1,41	1,60	0,27	1,54	2,14	0,50	1,08	0,56	0,92	1,55	1,06	0,48	0,43	2,26	1,01	0,49
SK	0,57	1,91	0,26	0,70	1,47	1,32	1,76	0,77	0,44	1,67	1,36	0,52	0,67	0,97	1,01	0,55
CEEC10	0,55	0,57	0,21	0,77	0,85	0,69	0,78	0,48	0,48	0,41	0,59	0,44	0,37	0,28	0,64	0,40
HR	1,32	0,38	0,30	4,25	11,34	1,27	14,25	0,31	0,48	-	1,53	0,46	0,55	13,89	1,63	0,48
MK	0,57	1,00	0,14	0,11	1,38	0,58	7,01	0,15	0,28	-	1,80	0,23	0,27	2,19	1,32	0,24
AM	0,04	-	2,59	-	-	6,97	0,63	-	4,86	-	18,75	1,32	-	-	-	1,48
AZ	4,31	-	3,39	0,12	-	6,56	1,14	1,20	69,46	4,61	0,26	0,97	0,35	0,38	6,83	0,90
BY	1,99	12,17	2,00	3,72	12,27	18,50	5,46	4,99	2,18	29,64	6,16	3,65	2,16	5,29	10,99	3,75
GE	6,53	0,82	3,53	0,47	5,55	0,70	-	1,02	0,83	4,15	19,24	1,44	6,71	-	10,62	1,60
KG	-	-	2,05	-	24,13	7,63	-	7,16	7,99	-	0,23	1,26	1,14	7,53	5,01	1,33
KZ	1,01	10,01	0,94	9,28	4,13	1,38	6,66	0,83	1,02	3,48	0,50	0,99	3,75	0,51	2,55	1,02
MD	22,67	101,93	2,34	1,38	184,39	243,82	0,50	3,81	8,24	36,19	8,35	4,33	10,42	83,01	14,55	4,73
RU	0,21	1,00	0,28	0,52	1,27	0,66	0,07	0,33	0,19	2,15	0,22	0,32	0,24	0,16	0,49	0,31
TJ	0,06	-	1,03	0,84	10,42	-	-	3,14	0,02	-	0,05	0,15	0,08	0,06	0,33	0,15
TM	0,70	-	0,62	1,17	0,47	0,37	1,64	0,20	19,60	0,43	19,99	0,50	2,38	0,16	1,49	0,50
UA	17,79	4,53	2,95	3,92	5,98	4,45	34,42	1,28	6,74	7,28	6,84	3,09	1,13	13,94	184,06	3,05
UZ	0,80	1,40	0,20	12,07	0,66	0,51	3,37	0,36	7,27	0,36	11,68	0,42	1,14	1,43	54,98	0,46
Former USSR	0,35	1,27	0,45	0,85	1,72	1,02	0,12	0,52	0,31	2,31	0,36	0,50	0,41	0,25	0,70	0,48
East	0,43	0,77	0,28	0,52	1,49	0,91	0,21	0,50	0,32	1,97	0,48	0,44	0,37	0,31	0,70	0,43

Table 12: Trade Potential versus Actual Trade from West to East : EU Enlargement by 5 CEEC
Potential exports/actual exports; Gravity equation (9a); average 1993 to 1994

	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK	CEEC10	HR	MK
BE-LU	0,84	1,02	1,56	0,85	1,19	0,94	0,99	1,49	1,28	1,27	1,02	1,14	0,57
DK	1,27	2,30	0,95	2,55	0,68	0,84	1,18	2,61	3,17	2,14	1,54	0,94	1,18
DE	0,46	0,60	1,43	0,51	0,50	0,63	0,75	0,54	0,52	0,47	0,61	0,38	0,25
GR	0,11	1,83	9,68	2,31	3,46	7,85	2,36	0,60	3,55	1,41	0,76	2,44	0,11
ES	1,62	2,03	8,15	1,66	3,58	6,97	1,94	2,68	1,81	2,39	2,00	2,90	17,46
FR	1,28	1,91	6,86	2,12	1,88	2,88	2,20	0,95	0,81	2,38	1,73	2,07	0,95
IE	2,21	1,10	2,64	1,47	4,38	3,58	1,85	4,37	2,72	6,61	1,78	3,00	7,72
IT	0,68	1,50	3,78	1,04	2,24	3,06	1,13	0,53	0,64	0,89	0,98	0,34	0,22
NL	0,59	1,07	1,18	0,90	0,67	0,93	0,79	0,89	0,96	0,99	0,88	0,40	0,27
PT	1,58	6,83	8,35	3,21	1,58	9,42	19,33	7,28	4,05	4,75	5,58	7,94	-
GB	1,63	4,23	6,15	1,83	2,07	1,24	1,97	1,35	2,13	0,64	1,75	2,54	15,05
EU12	0,66	0,91	2,14	0,87	0,94	1,15	1,04	0,89	0,98	0,80	0,95	0,52	0,64
AT	0,50	0,61	5,33	0,48	4,81	3,56	1,39	1,11	0,43	1,05	0,70	0,38	0,26
FI	0,72	1,05	0,15	0,75	0,44	0,33	0,89	3,23	1,80	0,76	0,58	1,80	1,87
SE	1,73	1,69	0,61	1,15	1,05	0,65	1,55	3,06	1,76	2,13	1,38	0,68	1,23
EU15	0,67	0,89	0,76	0,80	0,94	1,01	1,07	0,93	0,93	0,86	0,92	0,52	0,63

	AM	AZ	BY	GE	KG	KZ	MD	RU	TJ	TM	UA	UZ	Former USSR	East
BE-LU	1,48	3,74	2,96	2,54	8,43	2,66	6,66	1,15	4,33	4,16	4,79	6,58	1,63	1,23
DK	1,85	5,01	8,82	2,42	4,79	5,00	14,67	1,96	1,33	22,01	7,50	5,05	2,35	1,89
DE	3,58	2,61	1,20	4,03	3,35	0,57	2,92	0,64	4,04	1,15	1,81	1,09	0,84	0,67
GR	2,30	7,66	15,48	1,45	101,13	3,91	4,49	1,10	17,93	14,99	1,94	13,40	1,60	0,95
ES	34,64	31,62	16,56	12,24	18,04	16,48	32,58	3,00	1.187,27	5,62	15,41	99,73	4,76	2,80
FR	2,21	5,25	7,96	1,85	15,20	2,02	8,29	1,97	7,92	10,90	6,60	5,57	2,74	2,07
IE	1,18	14,90	9,76	8,98	29,08	10,50	16,36	1,05	1,70	18,86	8,20	1,94	1,69	1,73
IT	3,21	3,62	5,86	1,48	3,72	1,90	5,92	1,22	3,91	0,82	4,17	5,32	1,78	1,08
NL	2,03	2,77	3,35	1,94	13,19	1,14	10,14	0,83	3,28	2,07	4,40	2,51	1,19	0,96
PT	-	16,12	12,36	4,33	-	25,56	8,53	2,84	10,55	15,18	4,16	28,08	3,76	4,58
GB	0,94	3,04	6,48	5,07	3,24	2,54	2,95	19,67	2,68	1,24	2,68	6,72	3,01	2,09
EU12	1,48	3,68	2,67	2,84	4,20	1,20	4,53	1,03	3,07	1,66	3,22	3,58	1,45	1,07
AT	64,04	3,30	5,49	8,26	46,08	1,33	26,12	1,26	2,74	1,71	6,27	5,23	1,98	0,83
FI	13,67	5,55	4,96	12,05	41,97	1,90	12,73	0,62	18,01	2,26	4,75	8,08	0,63	0,72
SE	2,91	14,24	21,12	21,24	6,86	4,11	48,61	3,06	7,19	17,36	17,01	29,54	2,94	2,06
EU15	1,58	3,84	2,99	3,06	4,44	1,27	5,03	1,05	3,13	1,75	3,53	3,74	1,43	1,06

Notes: 5 CEEC = Czech Republic (CZ), Estonia (EE), Hungary (HU), Poland (PL), Slovenia (SI).

Table 13: Trade Potential versus Actual Trade from East to West : EU Enlargement by 5 CEEC
Potential exports/actual exports; Gravity equation (9a); average 1993 to 1994

	BE-LU	DK	DE	GR	ES	FR	IE	IT	NL	PT	GB	EU12	AT	FI	SE	EU15
BG	0,21	0,41	0,20	0,06	0,58	0,37	2,43	0,24	0,21	0,43	0,36	0,23	0,28	0,52	0,85	0,24
CZ	0,76	0,90	0,35	0,54	1,26	2,32	2,13	0,81	0,51	1,85	0,93	0,57	0,28	1,21	1,02	0,54
EE	1,35	0,38	1,05	8,91	22,88	11,77	7,80	5,28	0,47	1,34	1,78	1,47	5,61	0,18	0,29	0,73
HU	0,68	1,83	0,32	1,21	2,22	1,40	6,81	0,72	0,63	3,66	1,09	0,62	0,31	0,90	0,97	0,58
LT	0,35	0,23	0,31	2,62	0,41	0,93	2,02	1,23	0,11	1,29	0,26	0,36	2,19	0,54	0,27	0,37
LV	0,94	0,73	0,71	8,33	11,07	2,93	0,40	2,96	0,25	1,82	0,42	0,82	0,82	0,48	0,27	0,70
PL	0,47	0,33	0,28	1,11	1,75	1,06	0,59	0,86	0,26	2,29	0,79	0,45	0,64	0,45	0,58	0,46
RO	0,28	2,32	0,19	0,18	0,99	0,38	1,58	0,19	0,15	3,17	0,41	0,25	0,36	4,45	0,85	0,27
SI	1,44	1,61	0,29	1,77	2,61	0,56	1,20	0,72	0,98	1,91	1,25	0,56	0,49	2,46	1,09	0,56
SK	0,40	1,26	0,19	0,54	1,22	1,00	1,31	0,56	0,32	1,39	1,07	0,38	0,43	0,69	0,71	0,40
CEEC10	0,61	0,60	0,29	0,86	1,03	0,86	0,90	0,60	0,56	0,42	0,78	0,53	0,41	0,33	0,75	0,48
HR	0,90	0,25	0,21	3,16	9,08	0,94	10,44	0,21	0,35	-	1,19	0,33	0,33	9,98	1,17	0,34
MK	0,44	0,74	0,11	0,10	1,20	0,48	5,63	0,12	0,23	-	1,55	0,19	0,19	1,69	1,02	0,20
AM	0,03	-	2,49	-	-	6,73	0,57	-	4,46	-	18,56	0,71	-	-	-	0,79
AZ	3,98	-	3,36	0,12	-	6,54	1,06	1,19	65,63	4,74	0,26	0,95	0,31	0,33	6,07	0,88
BY	1,51	8,37	1,61	3,08	10,90	15,34	4,27	4,11	1,68	26,27	5,22	2,98	1,53	3,54	7,54	2,98
GE	5,91	0,71	3,43	0,42	5,67	0,68	-	0,98	0,77	4,22	19,32	1,40	5,78	-	9,28	1,53
KG	-	-	2,03	-	24,90	7,58	-	7,12	7,53	-	0,23	1,24	1,02	6,52	4,42	1,30
KZ	0,94	8,77	0,94	8,98	4,28	1,38	6,19	0,83	0,96	3,56	0,51	0,98	3,38	0,45	2,26	1,00
MD	17,95	75,81	1,97	1,11	168,38	209,95	0,41	3,20	6,71	33,05	7,40	3,67	7,55	62,76	11,13	3,95
RU	0,19	0,81	0,27	0,49	1,29	0,63	0,06	0,32	0,17	2,16	0,21	0,30	0,20	0,15	0,39	0,28
TJ	0,05	-	1,08	0,84	11,33	-	-	3,29	0,02	-	0,06	0,16	0,08	0,06	0,31	0,15
TM	0,62	-	0,59	1,05	0,46	0,35	1,46	0,19	17,61	0,42	19,34	0,47	2,02	0,13	1,26	0,46
UA	14,76	3,49	2,61	3,41	5,75	4,02	29,51	1,14	5,73	6,98	6,34	2,75	0,87	10,71	144,11	2,67
UZ	0,77	1,28	0,20	12,07	0,71	0,53	3,27	0,37	7,16	0,38	12,37	0,44	1,07	1,30	50,84	0,47
Former USSR	0,30	1,00	0,41	0,77	1,71	0,96	0,11	0,48	0,27	2,28	0,34	0,46	0,33	0,22	0,55	0,44
East	0,42	0,70	0,32	0,54	1,68	0,97	0,21	0,53	0,32	2,22	0,52	0,47	0,36	0,30	0,64	0,46

Table 14: Trade Potential versus Actual Trade from West to East : EU Enlargement by 5 CEEC
Potential exports/actual exports; Gravity equation (9b); average 1993 to 1994

	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK	CEEC10	HR	MK
BE-LU	1,09	1,40	2,05	1,11	1,65	1,34	1,18	1,83	1,93	1,88	1,33	1,71	0,76
DK	1,71	3,34	1,40	3,51	1,04	1,36	1,56	3,40	4,84	3,32	2,13	1,42	1,65
DE	0,56	0,63	1,75	0,64	0,65	0,84	0,66	0,62	0,74	0,66	0,66	0,54	0,31
GR	0,11	2,10	11,20	2,78	4,32	9,96	2,49	0,75	4,72	1,86	0,89	3,32	0,12
ES	1,83	2,24	9,04	1,83	4,20	8,40	1,92	2,88	2,28	2,95	2,17	3,68	20,56
FR	1,53	2,35	8,22	2,53	2,38	3,76	2,37	1,08	1,12	3,21	2,05	2,84	1,18
IE	2,73	1,38	3,39	1,81	5,84	4,95	2,09	5,17	3,76	9,08	2,17	4,17	9,90
IT	0,85	1,89	4,49	1,30	2,85	3,99	1,24	0,62	0,76	1,25	1,17	0,51	0,28
NL	0,74	1,41	1,53	1,13	0,91	1,31	0,91	1,06	1,38	1,41	1,10	0,57	0,35
PT	1,77	7,46	9,27	3,51	1,85	11,32	19,07	7,77	5,02	5,78	5,99	9,91	-
GB	1,80	5,47	6,24	2,10	2,65	1,62	2,27	1,41	2,23	0,76	1,91	2,59	18,14
EU12	0,78	1,07	2,60	1,07	1,22	1,53	1,07	1,00	1,19	1,12	1,09	0,74	0,79
AT	0,71	0,74	7,22	0,60	7,13	5,35	1,82	1,50	0,59	1,67	0,92	0,65	0,39
FI	0,94	1,37	0,28	0,97	0,68	0,55	1,12	4,07	2,55	1,09	0,79	2,56	2,50
SE	2,24	2,23	0,97	1,50	1,62	1,08	1,95	3,84	2,51	3,09	1,83	0,98	1,64
EU15	0,80	1,05	1,02	0,99	1,26	1,39	1,14	1,05	1,14	1,24	1,08	0,75	0,78

	AM	AZ	BY	GE	KG	KZ	MD	RU	TJ	TM	UA	UZ	Former USSR	East
BE-LU	1,72	4,21	3,99	2,92	9,45	2,95	8,67	1,34	4,62	4,88	5,92	7,05	1,96	1,54
DK	2,26	5,96	13,14	2,93	5,69	5,86	20,37	2,49	1,51	27,24	9,99	5,72	3,08	2,55
DE	3,87	2,73	1,52	4,31	3,49	0,59	3,57	0,70	4,01	1,25	2,10	1,09	0,94	0,74
GR	2,65	8,43	18,96	1,65	107,68	4,11	5,69	1,19	18,37	17,06	2,26	13,70	1,79	1,09
ES	35,57	31,45	18,96	12,37	17,97	16,24	36,60	3,01	1.129,74	5,87	16,34	94,90	4,92	2,97
FR	2,37	5,47	9,82	1,96	15,80	2,08	9,93	2,12	7,85	11,86	7,47	5,53	3,03	2,38
IE	1,34	16,43	12,70	10,05	32,34	11,56	20,44	1,19	1,80	21,81	9,74	2,06	1,97	2,06
IT	3,49	3,79	7,26	1,59	3,86	1,94	7,24	1,32	3,88	0,90	4,79	5,28	1,98	1,27
NL	2,30	3,04	4,42	2,17	14,47	1,24	12,84	0,94	3,43	2,37	5,30	2,63	1,39	1,17
PT	-	16,09	14,12	4,38	-	25,41	9,54	2,86	10,12	15,95	4,40	26,93	3,89	4,83
GB	1,08	3,18	6,30	5,98	3,26	2,62	3,65	22,83	3,51	1,20	2,84	7,41	3,46	2,31
EU12	1,66	3,88	3,33	3,15	4,34	1,24	5,57	1,12	3,71	1,81	3,73	3,77	1,64	1,23
AT	77,94	3,88	7,89	9,97	53,24	1,52	37,18	1,55	3,03	2,08	8,35	5,78	2,53	1,10
FI	16,70	6,60	7,59	14,60	50,11	2,24	17,36	0,64	20,39	2,79	6,33	9,20	0,76	0,89
SE	3,49	16,65	31,52	25,29	8,04	4,77	65,59	3,89	8,00	21,14	22,27	33,01	3,88	2,70
EU15	1,77	4,12	3,84	3,43	4,64	1,34	6,27	1,16	3,77	1,94	4,17	3,96	1,65	1,24

Table 15: Trade Potential versus Actual Trade from East to West: EU Enlargement by 5 CEEC

Potential exports/actual exports; Gravity equation (9b); average 1993 to 1994

	BE-LU	DK	DE	GR	ES	FR	IE	IT	NL	PT	GB	EU12	AT	FI	SE	EU15
BG	0,27	0,54	0,24	0,07	0,64	0,42	2,92	0,29	0,26	0,48	0,41	0,27	0,38	0,65	1,06	0,29
CZ	1,03	1,28	0,36	0,61	1,38	2,81	2,63	1,01	0,66	2,01	1,08	0,65	0,34	1,54	1,33	0,63
EE	1,74	0,54	1,25	10,19	24,98	13,80	9,83	6,14	0,60	1,47	2,06	1,76	7,44	0,33	0,46	0,94
HU	0,87	2,46	0,40	1,45	2,42	1,65	8,24	0,88	0,78	3,97	1,24	0,75	0,38	1,14	1,24	0,70
LT	0,48	0,34	0,40	3,22	0,47	1,15	2,64	1,53	0,15	1,48	0,31	0,46	3,16	0,82	0,41	0,48
LV	1,32	1,15	0,93	10,42	13,09	3,73	0,54	3,77	0,35	2,16	0,53	1,06	1,20	0,79	0,43	0,93
PL	0,54	0,43	0,24	1,16	1,70	1,12	0,65	0,92	0,29	2,23	0,81	0,45	0,81	0,56	0,72	0,47
RO	0,34	2,92	0,21	0,22	1,03	0,42	1,82	0,21	0,17	3,32	0,44	0,28	0,47	5,46	1,04	0,30
SI	2,14	2,43	0,41	2,34	3,26	0,77	1,65	0,85	1,39	2,36	1,62	0,73	0,66	3,44	1,53	0,74
SK	0,57	1,91	0,26	0,70	1,47	1,32	1,76	0,77	0,44	1,67	1,36	0,52	0,67	0,97	1,01	0,55
CEEC10	0,68	0,81	0,30	1,07	1,18	0,98	1,09	0,69	0,68	0,54	0,85	0,61	0,53	0,39	0,93	0,57
HR	1,32	0,38	0,30	4,25	11,34	1,27	14,25	0,31	0,48	-	1,53	0,46	0,55	13,89	1,63	0,48
MK	0,57	1,00	0,14	0,11	1,38	0,58	7,01	0,15	0,28	-	1,80	0,23	0,27	2,19	1,32	0,24
AM	0,04	-	2,59	-	-	6,97	0,63	-	4,86	-	18,75	0,75	-	-	-	0,84
AZ	4,31	-	3,39	0,12	-	6,56	1,14	1,20	69,46	4,61	0,26	0,97	0,35	0,38	6,83	0,90
BY	1,99	12,17	2,00	3,72	12,27	18,50	5,46	4,99	2,18	29,64	6,16	3,65	2,16	5,29	10,99	3,75
GE	6,53	0,82	3,53	0,47	5,55	0,70	-	1,02	0,83	4,15	19,24	1,44	6,71	-	10,62	1,60
KG	-	-	2,05	-	24,13	7,63	-	7,16	7,99	-	0,23	1,26	1,14	7,53	5,01	1,33
KZ	1,01	10,01	0,94	9,28	4,13	1,38	6,66	0,83	1,02	3,48	0,50	0,99	3,75	0,51	2,55	1,02
MD	22,67	101,93	2,34	1,38	184,39	243,82	0,50	3,81	8,24	36,19	8,35	4,33	10,42	83,01	14,55	4,73
RU	0,21	1,00	0,28	0,52	1,27	0,66	0,07	0,33	0,19	2,15	0,22	0,32	0,24	0,16	0,49	0,31
TJ	0,06	-	1,03	0,84	10,42	-	-	3,14	0,02	-	0,05	0,15	0,08	0,06	0,33	0,15
TM	0,70	-	0,62	1,17	0,47	0,37	1,64	0,20	19,60	0,43	19,99	0,50	2,38	0,16	1,49	0,50
UA	17,79	4,53	2,95	3,92	5,98	4,45	34,42	1,28	6,74	7,28	6,84	3,09	1,13	13,94	184,06	3,05
UZ	0,80	1,40	0,20	12,07	0,66	0,51	3,37	0,36	7,27	0,36	11,68	0,42	1,14	1,43	54,98	0,46
Former USSR	0,36	1,28	0,45	0,85	1,74	1,03	0,13	0,53	0,31	2,33	0,36	0,50	0,42	0,26	0,71	0,49
East	0,53	0,94	0,35	0,61	1,78	1,10	0,25	0,62	0,38	2,34	0,58	0,53	0,46	0,37	0,82	0,53

Table 16: Confidence Intervals for Estimated Trade Flows with Gravity Equations

Exporter	Bilateral export flow potentials are estimated with:							
	Gravity equation (9a)				Gravity equation (9b)			
	Importer							
	EU15	CEEC10	Former USSR	East	EU15	CEEC10	Former USSR	East
	(Up minus potential) in % of potential				(Up minus potential) in % of potential			
EU15	279	288*)	284*)	287*)	273	279*)	281*)	279*)
CEEC10	288	-	-	-	280	-	-	-
Former USSR	285	-	-	-	281	-	-	-
East	286	-	-	-	280	-	-	-
	(Potential minus low) in % of potential				(Potential minus low) in % of potential			
EU15	74	74*)	74*)	74*)	73	74*)	74*)	74*)
CEEC10	74	-	-	-	74	-	-	-
Former USSR	74	-	-	-	74	-	-	-
East	74	-	-	-	74	-	-	-
	(Up minus low) in % of potential				(Up minus low) in % of potential			
EU15	353	362*)	358*)	361*)	346	353*)	355*)	353*)
CEEC10	362	-	-	-	354	-	-	-
Former USSR	359	-	-	-	355	-	-	-
East	360	-	-	-	354	-	-	-

*) Average of 14 EU countries.

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